

OCTOBER, 1959

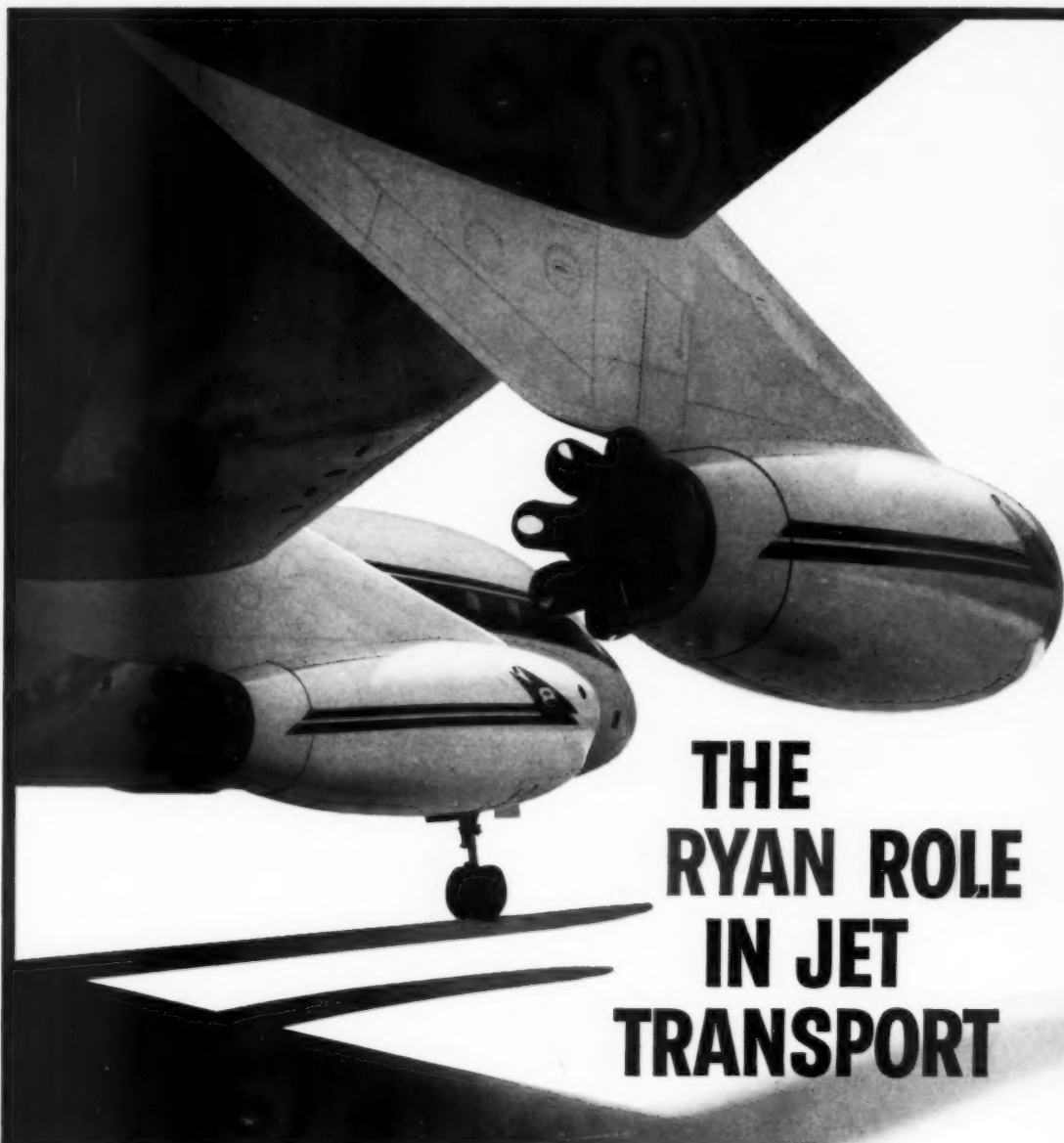


airlift

WORLD AIR TRANSPORTATION

In this issue:

- ALL ABOUT THE DC-8
(A SPECIAL REPORT)



THE RYAN ROLE IN JET TRANSPORT

Ryan's role is to BUILD BETTER—better power packs... better airframes... better navigation systems—for the aircraft and engine companies that build America's jet planes.

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*Safety Cell—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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OCTOBER, 1959

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AIRLIFT

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(U.S. Reg. Pdg.)

An AMERICAN AVIATION Publication Since 1937

WORLD AIR TRANSPORTATION

ON THE COVER: ALL ABOUT THE DC-8
On September 18 two U.S. domestic airlines, United and Delta, inaugurated passenger service with a new jet—the Douglas DC-8. For a complete report on all aspects of the DC-8, see pages 27 to 68.



WHAT'S DIFFERENT ABOUT THE DC-8?
Probably the most noticeable difference in the Douglas jet will be its outward appearance, particularly a pair of nose aircoops, heretofore non-existent on big airline transports. For an analysis on major innovations by Douglas on the DC-8, see page 27.



INSIDE THE DC-8: A NEW SEAT
The most significant departure in years of transport interior design makes its debut in the DC-8 with Douglas' Palomar seat, a design that removes cabin accessories from the overhead hatrack and puts them in the seat back within easy reach of the passenger. For details on DC-8 interiors, see page 34.



NOISE SUPPRESSION/THRUST REVERSAL
The two newest design problems facing jet manufacturers brought a \$20 million research and design project to Douglas for an answer on the DC-8. For the results and complete technical details on all other DC-8 systems, see pages 59-68.



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Coming Next Issue: Air Cargo's bottleneck on the ground. An exclusive *AIRLIFT* analysis by A. J. Roper, President of Mercury Air Freight, Inc. Also Jet Harbor, U.S.A., a special report on the design and development of Los Angeles International Airport, written exclusively for *AIRLIFT* by Charles Luckman, President, Charles Luckman Associates.

The world's fastest and most experienced jetliner

THE BOEING 707 IS ALREADY 24

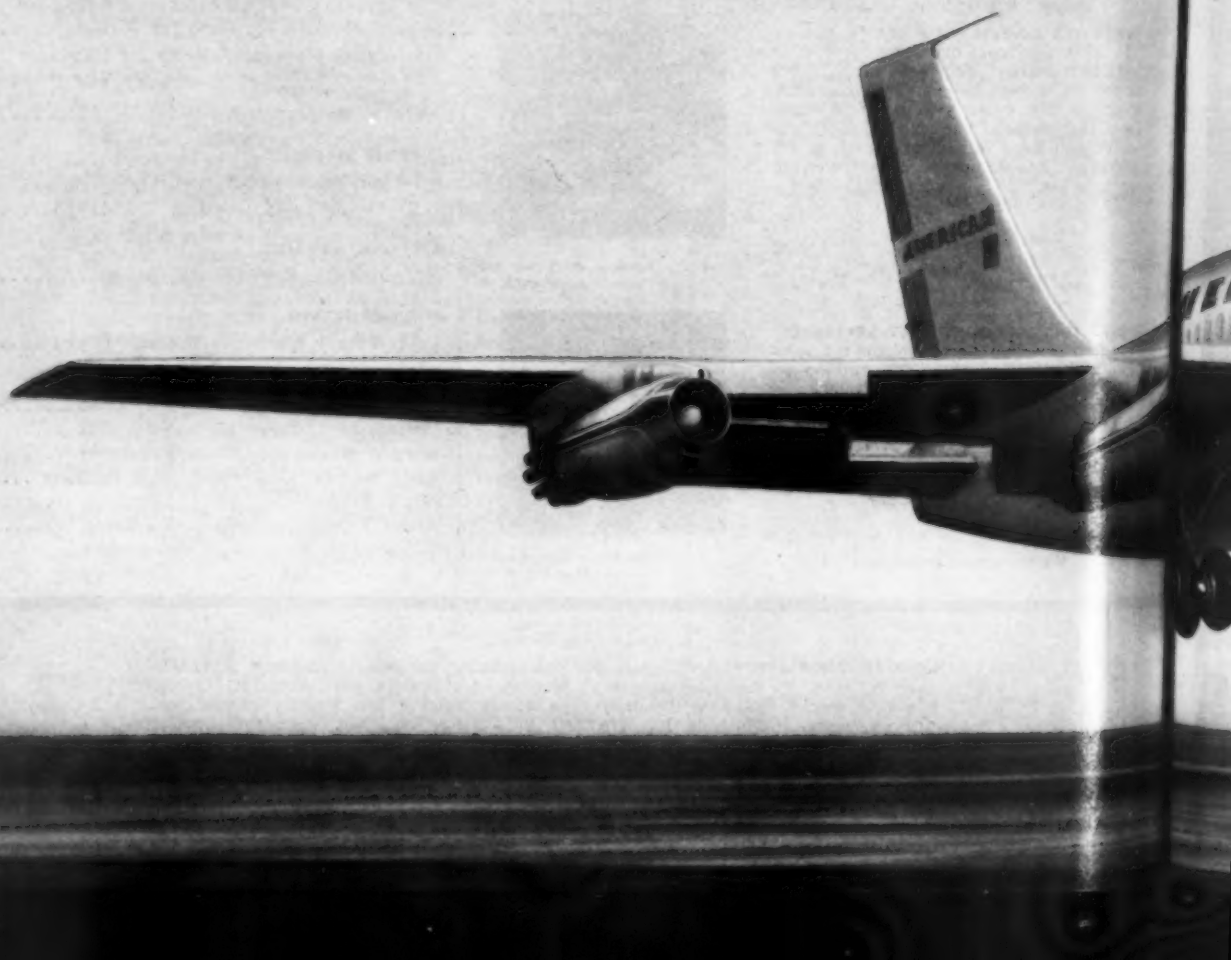
The world's most experienced jetliner—with more than 24 million miles of proven dependability in scheduled airline service. The 707 already has transported over 900,000 passengers, more than 2 billion passenger miles.

The most advanced design—the 707 was designed from the beginning as a passenger jetliner and built to the specifications of American Airlines and others of the world's most experienced airlines—by Boeing, designer and builder of more

large, multi-engine jet aircraft than any other manufacturer in the world.

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Fastest—the 707 is faster by a substantial margin than any other jetliner now in service.



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Quiet and vibration-free—No other U.S. jetliner is quieter, more restful, or more vibration-free. Find out for yourself. American's 707 Jet Flagships now serve New York, Los Angeles, San Francisco, Washington-Baltimore, Chicago, Boston and Dallas-Fort Worth.



AMERICAN AIRLINES *The Jet Airline*





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ALITALIA

The world's fastest growing airline

Mr. Hector Lights a Mighty Fuse

Twenty-two years ago the newly-created Civil Aeronautics Board was being hailed as a model of government regulation of a public service industry.

Today the five-man agency is in deep trouble. It is mired in its own red tape. It has no sense of direction. It has no forward-looking overriding policy. If judged in the light of hopes, expectations and efficiency, it is a failure.

But on top of its mediocre record, it is now faced with a crisis in leadership, the greatest in more than two decades.

Of its five members, three are leaving or have left. Of the remaining two, only Chan Gurney stands firm as a constructive and thoughtful force, for G. Joseph Minetti surely represents nothing more than a vote.

The three departures are unrelated but are nonetheless symptomatic of basic structural weakness of the agency.

Chairman James R. Durfee has been nominated to a judgeship on the U.S. Court of Claims. His confirmation by the Senate was blocked by a Wisconsin Senator until early next year, at least. Whether he decides to accept an interim appointment, or whether he remains on CAB to wait out what could be a stormy confirmation, the fact remains that his leadership of CAB will be ineffective from now on. It could hardly be otherwise for a man pursuing natural ambitions.

Harmar Denny, now 73, has long planned his exodus not later than the expiration of his term December 31.

But what really rocked the CAB and its future fate was the bombshell resignation last month of Louis J. Hector, the 44-year-old Democrat from Miami who had been setting high records as the most inspired and inspiring member of CAB in many years.

Like a bolt out of the blue, Mr. Hector resigned because he just doesn't think the CAB can work. He doesn't think it can be patched up. He believes fervently that a new concept of government regulation must be forthcoming. So intensely serious and sincere is he in these beliefs that he saw no alternative but to resign in order to focus full attention on the need for radical change.

Is the CAB hopelessly outmoded and must it be replaced? Obviously Mr. Hector thinks so, for his letter of resignation was one of the most expressive and direct ever to go to the White House. His words are worth reproducing here:

"After two and a half years on the Board . . . I have come to the belief that an independent regulatory com-

mission is not competent in these days to regulate a vital national industry in the public interest.

"This is a serious criticism, and I therefore submit to you with this letter a fuller statement in a memorandum.

"It is my belief also that we are trying to regulate far too many details of civil aviation—details which could better be left to management discretion and the free play of competitive forces. Provided the government retains always the basic residual powers necessary to prevent unfair competitive practices or excessive profits under a Federal license, many of our detailed controls of the rates and practices of the airlines could be terminated.

"I hope that my comments may be of help in the improvement of our machinery for regulating American business. Civil aviation has become far too important to our nation to be hobbled by a regulatory system which does not work."

What Mr. Hector is saying is simply that one regulatory agency cannot combine rule-making, policy formulation, planning, administration, adjudication, investigation and prosecution.

He believes there are only a few major controls which the government need apply with great care and precision in regulating any industry in the public interest. If the agencies could devote themselves to formulating clear policies in critical areas such as competition, licensing, selection between competing applicants, and the many facets of rate-regulation, and devote themselves to the judicial application of these policies in critical cases, everything else could be delegated or even forgotten about.

He proposes to give to the executive branch of government the functions of rule-making, policy formulation, planning and routine administration. He would give to a special expert tribunal or group of tribunals the task of deciding major litigated cases and of hearing appeals from administrative decisions. If there is a job of prosecution, then give this to a separate executive agency.

All of this strikes at the core of government operations and administrative philosophy. There is much to be said for his arguments. Unfortunately in our cumbersome world, such ideas take time to get translated into reality. More immediately, Mr. Hector's departure throws CAB into additional turmoil and uncertainty at a critical juncture in air transport history. The way ahead will not be smooth.

Wayne W. Parish

The measures of ability

FUNCTION

WEIGHT

SIZE

Holley goes Commercial on America's First Jet Airliner



Power for America's first jet airliner is furnished by four of these compact, Pratt & Whitney Aircraft JT-3 Jet Engines which deliver more than 13,000 lbs. of thrust, each.



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or Bleed
& Whit
-57 Jet



Record breaking Boeing 707 providing Americans with new speed and new comfort.

Holley Accessory selected for Pratt & Whitney Aircraft JT-3 Engine

Three basic goals rule the efforts of design, engineering, and manufacturing engineers at Holley: exceed, if desirable, minimum performance standards, lessen the weight, and reduce the size to allow more freedom of location on the engine. Another proof of Holley's success in attaining these goals is the choice of a Holley engine accessory for the Boeing 707; the Holley designed, engineered, and manufactured compressor bleed governor. This product and other Holley jet engine accessories (like the ones shown below) demonstrate hour after hour, in the world's airways, the Holley skills developed over more than half-a-century.

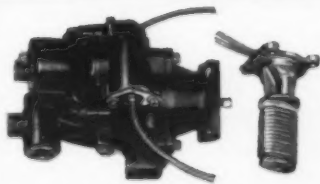


A-27 11955 E. NINE MILE ROAD
WARREN, MICHIGAN
Leader in the Design, Development and Manufacture
of Aviation Fuel Metering Devices

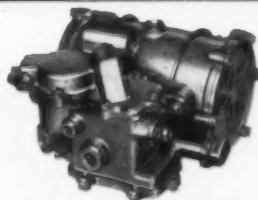
A few of Holley's Engine Accessories for Jet Aircraft



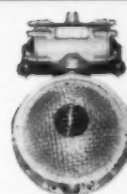
Holley designed R-92 Compressor Bleed Governor for the Pratt & Whitney Aircraft JT-3 and JT-57 Jet Engines.



A companion to the actuator is the R-98 Compressor Bleed Governor for the JT-4 Jet Engine.



Designed for Pratt & Whitney Aircraft JT-4 Jet Engine, the R-98 Bleed Piston Actuator is Holley designed and manufactured.



This bleed valve and actuator for the JT-3 Jet Engine manufactured to Pratt & Whitney Aircraft design by Holley

THE DISCERNING CUSTOMER IS OUR BEST CUSTOMER

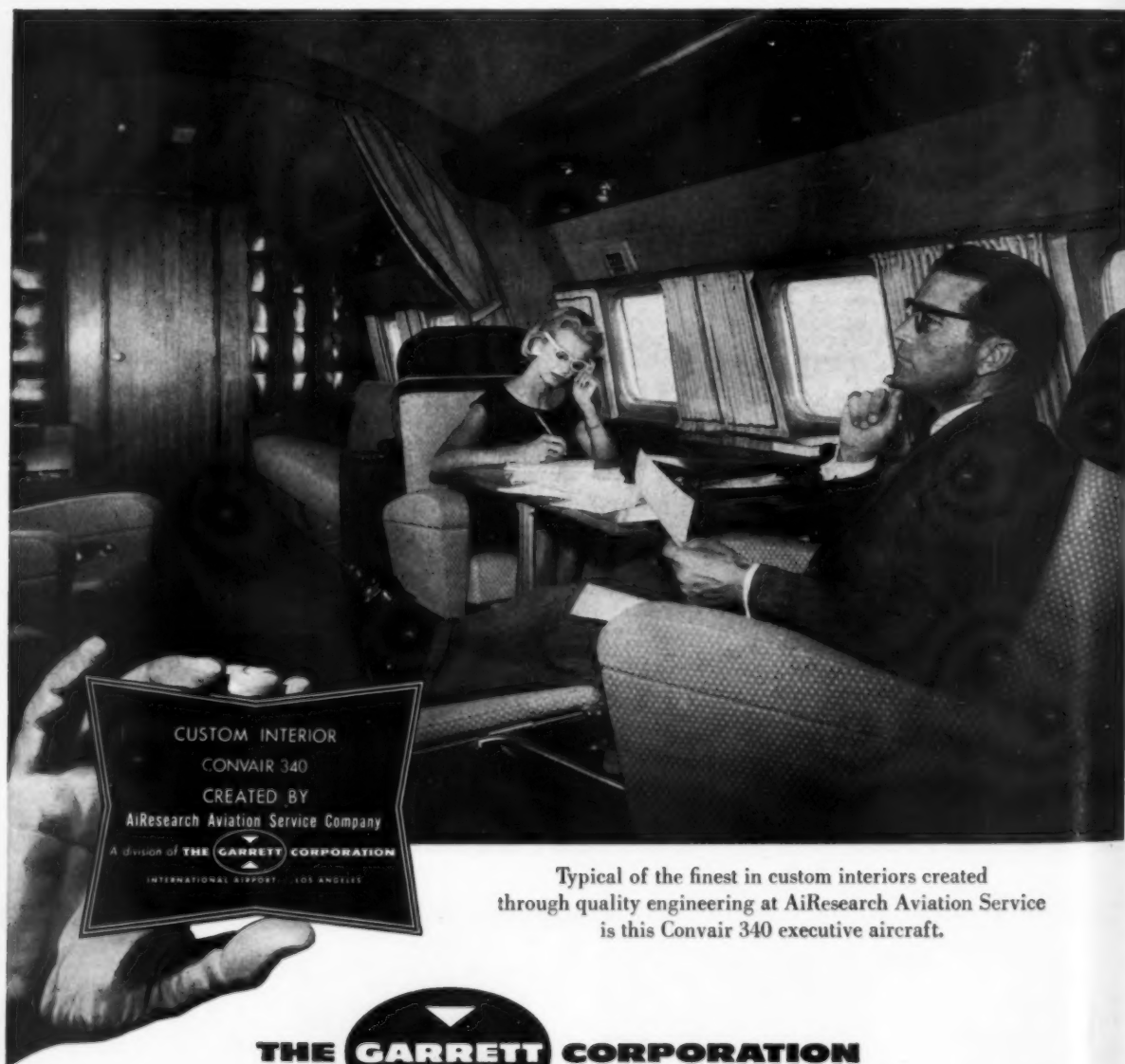
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Typical of the finest in custom interiors created through quality engineering at AiResearch Aviation Service is this Convair 340 executive aircraft.



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Don't Forget Emerson

To the Editor:

In the August issue of *AIRLIFT*, there appears an article in column three of page 48 titled "Clear Field in Recorders Shapes up for Waste King."

In this article, the reader is led to believe that our company, among others, is no longer active in airline recorder development. This is untrue as it relates to the Emerson Radio and Phonograph Corp., for our Government Electronics Division is presently manufacturing flight load recorders that essentially meet ARINC specifications for both the U.S. Air Force and the U.S. Navy.

We would appreciate your setting the record straight in your publication as pertains to our position in this matter as we intend to shortly repack our recorder and present it to the airlines for their use.

George Rappaport
V.P.—Marketing
Emerson Radio and Phonograph Corp.
Silver Spring, Md.

A New Interchange

To the Editor:

Re your July "Personal View" in which you comment on Oz Cocke's reflections on the changing patterns of air carrier traffic flow because of their customers' desires to fly the master schedules, this customer desire has been long noted by the users of business aircraft, long before the advent of jet carrier service.

Several years ago, TWA—after discussions with NBAA—came to the conclusion that increasing numbers of long-haul passengers were arriving at airports with airline terminals flying in their own company's aircraft. TWA made arrangements to accommodate this interchange between business aircraft and TWA schedules at the gate space assigned to TWA.

This policy was, a short time later, adopted by United Air Lines.

Obviously, at the crowded New York, Chicago, Washington and Los Angeles airports, this expeditious type of interchange was and is physically impossible. However, at a great number of other airports these two air carriers made arrangements to handle this interchange to the mutual benefit of the air carrier and their customers arriving by company-owned aircraft.

The advent of air carrier jet service has increased this interchange demand. For instance, a business man with Charleston, West Virginia as a departure point has his choice of jet service from Washington, D.C. (via Friendship Airport); from Pittsburgh or from Chicago. Whichever jet schedule best suits his convenience determines his boarding point.

This pattern has innumerable combinations—all of which point to the necessity for many air carriers and for many airport managers to take a close, hard and thoughtful look at their facilities, policies and procedures for handling this growing traffic interchange.

Gate spaces should be provided, adjacent to or contiguous with every airline in the country, for this interchange of passengers. Air carriers should closely examine and provide for the rapid, efficient transfer of these passengers and their baggage. Ticketing and baggage labeling

procedures should be streamlined to facilitate the transfers.

The business aircraft owner has, traditionally, paid his landing fees, paid his gasoline, city, state, and federal taxes, paid for airport services and purchased millions of dollars of airline tickets—so the question of who will pay for these needed and increasingly needed services has been well established.

If the scheduled air carriers—who depend largely on the businessman for their revenues—are to continue their progress, are to continue to increase their load factors, then it would appear that recognition of this interchange problem should be made along the tangible lines suggested above.

WILLIAM K. LAWTON
Executive Director
National Business Aircraft Assn.
Washington, D.C.

Quesada Comments

To the Editor:

Your editorial in the September issue of *AIRLIFT* has been brought to my attention. In it you get to the "core" of the problem that is facing us in many areas—the role of government.

You can be sure that I will continue to do all that I can to further and pursue those principles that have proven to be right.

Thank you so much for your interest and constructive views.

E. R. QUESADA, Administrator
Federal Aviation Agency
Washington, D.C.

More About Waste King

To the Editor:

On behalf of all of us at the Technical Products Division, Waste King Corp., Los Angeles, I want to thank you for the fine article about our flight data recorder in the July issue of *AIRLIFT*. I do want to clarify one point in the story, however: I am not the head of the division. Boyd T. Marshall, Waste King vice president, is its general manager.

Incidentally, \$6,500 is the maximum cost of the recorder, not minimum, and may decrease to a minimum of \$5,875, when the volume of additional orders reaches sufficient proportions.

S. GILMAN
Chief Electronics Engineer
Waste King Corp.
Los Angeles, Calif.

More on Ryan Dopplers

To the Editor:

The people at the Ryan Electronics Division were considerably upset when they saw the "Equipment World" spread in the August issue of *AIRLIFT* describing doppler nav aids.

As a company which has led the development of navigational devices using the doppler principle, we were disappointed to note factual errors in the brief paragraph relating to "RYANAV" equipments. Specifically, we would like to make the following corrections to your article:

1. All RYANAV doppler equipments operate in the frequency-band centered at 13.3 kmc/sec. This is the official FCC-assigned operating frequency for doppler nav aids.
2. The Ryan-built APN-67, rather than being the latest Ryan doppler set,

is historically one of the very first successful doppler navigator systems. Interestingly enough, to the best of our knowledge, the APN-67, and its descendent equipments are the only doppler nav aids for which data has been published showing the ability to meet ARINC specified (Characteristic No. 540) signal-to-noise requirements.

3. The Ground Speed/Drift Angle Indicator shown in the article is part of a system designed especially for low-speed aircraft as shown by the 300 knot maximum ground speed indication, and therefore, would be unsuited for high-speed civil application.

Don Fairchild
Ryan Aeronautical Co.
San Diego, Calif.

ED. NOTE: Agreed. Our reference to planned program for airline dopplers was predicated on ARINC's Characteristic 540 (which calls for 8750-8850 mc) to which a number of manufacturers are designing equipment.

When & Where

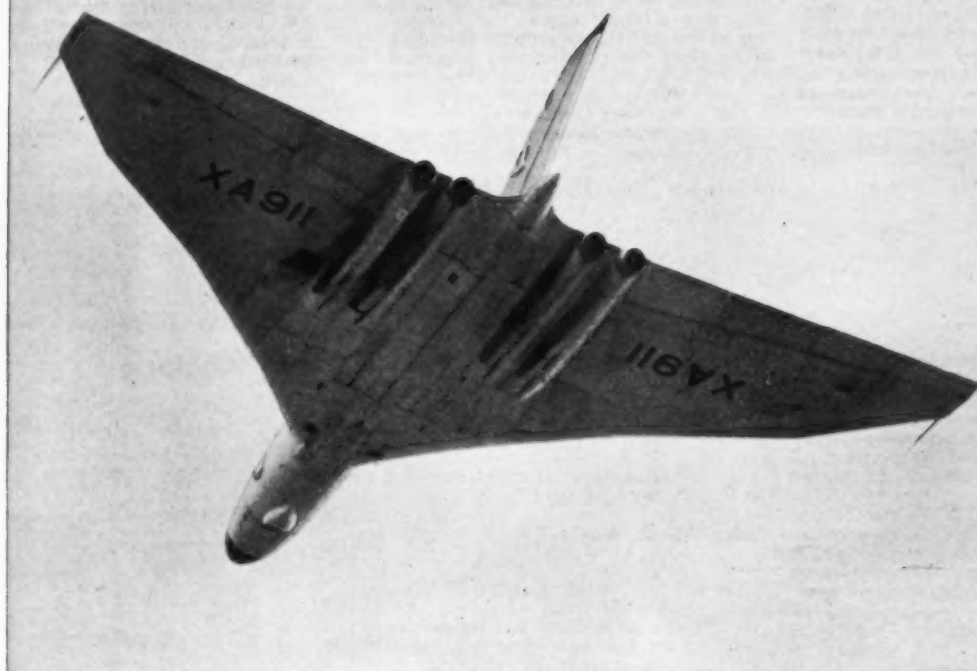
OCTOBER

- Oct. 5-7—Institute of Aeronautical Sciences, 7th Anglo-American aeronautical conference, technical sessions, Hotel Astor, New York City.
- Oct. 5-10—Society of Automotive Engineers, National aeronautics meeting, aircraft manufacturing forum and aircraft engineering display, Ambassador Hotel, Los Angeles.
- Oct. 6—New York State Dept. of Commerce Bureau of Aviation 12th annual airport development and operations conference, Hotel Onondaga, Syracuse, N.Y.
- Oct. 6—ATA Board of Directors meeting, ATA Conference Room, Washington, D.C.
- Oct. 6-8—National Business Aircraft Assn., 12th annual meeting, Hotel Leamington, Minneapolis.
- Oct. 6-8—National Airports Conference, co-sponsored by American Assn. of Airport Executives and University of Oklahoma, Norman, Okla.
- Oct. 6-8—ATA Stores & Materials Planning Committee, Hotel Carillon, Miami Beach.
- Oct. 7-8—Air Traffic Control Assn. air traffic control exposition and annual meeting, Oklahoma Biltmore, Oklahoma City.
- Oct. 12—International Air Transport Assn., 15th annual general meeting, Tokyo.
- Oct. 12-14—National Assn. of State Aviation Officials, Mark Hopkins Hotel, San Francisco.
- Oct. 12-14—National Defense Transportation Assn., 14th annual national convention and logistics forum, Seattle.
- Oct. 13-15—Air Line Pilots Assn. 7th annual air safety forum, Shoreland Hotel, Chicago.
- Oct. 19-24—American Society of Travel Agents, 29th annual World Travel Congress, Havana.
- Oct. 20-22—ATA engineering and maintenance annual meeting, Hotel Monteleone, New Orleans.
- Oct. 20-22—Air Line Dispatchers Assn., 17th convention, Dunes Hotel, Las Vegas, Nev.
- Oct. 22-23—American Assn. of Airport Executives Northeast Chapter, fall meeting, Bradley Field, Windsor Locks, Conn.
- Oct. 24-26—Institute of Radio Engineers, East Coast Aeronautical & Navigation Electronics conference, Baltimore.
- Oct. 26-27—Flight Safety Foundation, International air safety seminar, Nice, France.

NOVEMBER

- Nov. 9-20—American University, 13th annual air transportation institute, Washington, D.C.
- Nov. 17-19—ATA Purchasing Committee, Hotel Knickerbocker, Chicago.
- Nov. 17-19—Aviation Distributors and Manufacturers Assn., 34th meeting, Diplomat Hotel and Country Club, Hollywood, Fla.
- Nov. 18-19—Airlines Electronic Engineering Committee, Hotel Statler, Dallas.
- Nov. 18-20—Vickers Aircraft Hydraulics Conference, Park Shelton Hotel, Detroit.

'V'-bombers fly 10 miles a minute
10 miles up for 10 hours...



...AND BRISTOL SIDDELEY

One of the largest manufacturers of motive power units in the world, Bristol Siddeley Engines Limited produce two outstanding high-thrust turbojet engines—the Olympus and the Sapphire.

Between them these two engines power the most potent part of the RAF's strategic V-bomber fleet. The Olympus which delivers 17,000-lb thrust dry (24,000 lb with reheat) powers the Avro Vulcan. The Sapphire powers the Handley Page Victor. These engines give the V-bombers supersonic capability—long range—great altitude—superior performance to any other aircraft of their type in the world.

BES BRISTOL SIDDELEY ENGINES LIMITED



ESUPPLY THE POWER

POWER FOR THIS



AND THIS



...AND THIS



The Bristol Siddeley Proteus powers the Britannia airliner. Four Proteus give this 130-seat aeroplane a speed of over 400 mph—a range of over 5,000 miles. Britannias are in service with ten airlines and with RAF Transport Command.

The Star Sapphire car is powered by a Bristol Siddeley 4-litre engine. Combining great power with exceptional quietness and luxurious comfort, the new Star Sapphire has a top speed of over 100 mph and an outstanding all-round performance.

Bristol Siddeley Viper turbojets range from 1,640—3,000-lb thrust. Vipers power the Australian Jindivik, the Hunting Jet Provost, the Italian Macchi MB 326 (illustrated), and have proved their supersonic capabilities in mixed powerplant fighters.

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Fast, One-airline Service Across the World

Fly TWA Boeing 707s coast to coast, or *TWA JETSTREAMS** worldwide! Only TWA serves 70 major cities in the United States and 23 world centers abroad. At home or overseas, you can choose renowned First Class Ambassador luxury... cocktails, delicious full-course meals. Or *save* with thrifty, dependable Coach flights. Either way, enjoy the relaxing comfort and superlative, courteous service that are traditional on TWA. For reservations on your next trip, call your travel agent or nearest TWA office.



FLY THE FINEST... FLY **TWA** **TRANS WORLD AIRLINES**

* Jetstream is a service mark owned exclusively by TWA



The Cargo Outlook

Guaranteed loans for operators purchasing new cargo airplanes are probably out for good, although another legislative attempt may be made next year. More important, however, is prospect of MATS reorganization into combat transport service, releasing 1 billion ton-miles of overseas cargo annually to commercial lines (airlines performed only half that amount last year). Orders for new planes would be forthcoming at once from carriers, without government loans, with that much cargo business available.

Here's the first DC-8 traffic report: United's New York-San Francisco load factor for first week was over 90%. Delta's Atlanta-New York was 68.68%. First-class load factor on Delta was 84.79%, coach 58.23%. Company says it set Atlanta departures to avoid traffic delays and thus maintain dependable schedules, but in doing so is sacrificing considerable northbound connecting business. At the time of day it is operating, business travel predominates (first-class), accounting for low coach loads.

August Biggest Traffic Month

Year's biggest traffic month for trunklines was August. The 2.71 billion passenger-miles—highest for any August on record—were 13.9% ahead of same month last year; 4.08 billion available seat-miles were up 8.2%. Load factor was 66.47%.

CAB scoreboard: Chairman James R. Durfee expected to take interim appointment to U.S. Court of Claims, risk Senate confirmation next year (p. 21). Member Harmar Denny will depart not later than Dec. 31. Unexpected resignation of Louis J. Hector means third replacement, but vacancy expected to be filled shortly. Reshuffling means inevitable delays, uncertainty on policies.

Contract Overhaul on the Increase

Contract engine overhaul firms are experiencing up-turn in piston overhaul activity from both business operators and airlines. Reequipment among locals with R2800-powered Convairs is one factor. And new business is helping such established shops as Airwork Corp. to gear facilities for turbines. At business aircraft symposium last week, the Millville, N.J. firm announced \$500,000 facility expansion to include \$125,000 test cell, Rolls-Royce Dart overhaul shop, expansion of various accessory shops, to be ready by next summer.

Evidence of TWA's comeback is 3.8 billion domestic and international passenger-miles flown in first eight months of 1959, and 615 million in August. TWA claims these figures are higher than those of any other airline in the world.

Capital's Equipment, Financing Unsettled

Hottest equipment topic is Capital Airlines' reported shift from Convair 880s to Boeing 720s. But issue is still up in the air; Convair wasn't out of the running at presstime. And Capital's financing isn't settled. British, holding Viscount loan, agreed reluctantly to subordinate their claims to permit refinancing, have relinquished certain "approval" rights held over Capital's equipment decisions. Two brokerage firms are reported working on financing, which must include sale of more equity securities. Latter step has been made difficult by lack of earnings, rumors of management changes.

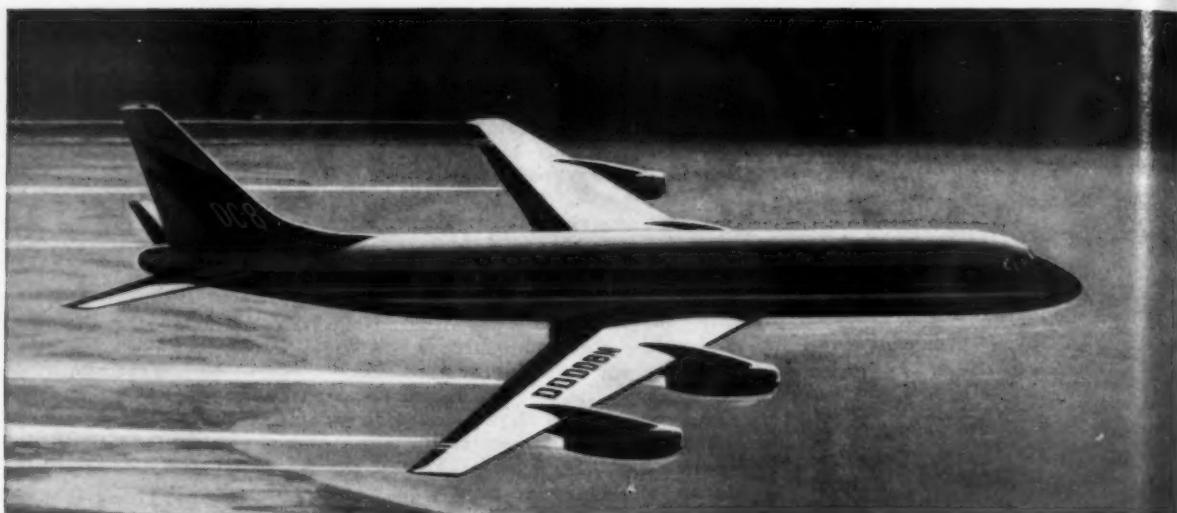
Fairchild estimates that after delivery of the 100th aircraft it will begin to profit on the F-27 turboprop. Record to date: 58 in service, 17 firm orders.

It cost Eastern Air Lines \$372,000 to reduce its DC-8 order from 20 to 16. Amount represented loss of interest to EAL on money it had on deposit with Douglas. EAL agreed to forego the interest after cancellation negotiations. Douglas originally suggested payment of \$575,000 per canceled aircraft.

Eland DC-7 Project Revived

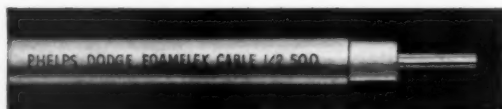
Project to modify DC-7s to Napier Eland turboprops is again gaining momentum. Douglas has agreed to supply engineering for \$650,000 or a total package, including systems engineering, for \$1.6 million. English Electric and Napier are preparing new brochure, will launch marketing program by mid November. It will include unmodified airframe (370-mph cruise) with Elands at \$800,000 to \$900,000, or with modified wing and tail (410 mph) at \$900,000 to \$1 million. Delivery will be offered 18 months after go-ahead.

Smaller version of four-jet VC-10, designated VC-11, has been designed by Vickers-Armstrongs. It's intended for same market as proposed medium-range Douglas DC-9.



REQUIRED: A lightweight, low-loss, radiation-free cable with electrical uniformity for interconnecting the navigation and communication antenna circuits of the Douglas Aircraft Co.'s new DC-8 jet airliner.

SPECIFIED: *Foamflex[®] Coaxial Cable*



A semi-flexible cable with tubular copper inner conductor, foamed polyethylene dielectric and commercially pure aluminum outer conductor.

With outstanding advantages for use in aircraft navigation, communication and warning circuits that include:

1. Twice the efficiency of solid dielectric (RG-8^{A/U}) type of cable now in general use.
2. Extended life characteristics that permit permanent installation and assure electrical stability during the life of the plane.
3. Good frequency response over wide temperature variations; capable of withstanding highest summer ground temperatures, as well as extremely low temperatures found at high altitudes.
4. Greater efficiency and improved system performance without the use of additional electronic components.
5. Ability to operate in both pressurized and non-pressurized parts of a plane without the use of cable dehydrators or pressurizing systems.
6. Lighter and smaller than many cables now installed in aircraft.

Foamflex coaxial cable is supplied in long lengths on lightweight, disposable reels. For further information or inquiries, write Dept. FC.



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FUEL BOOSTER PUMP

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3,000

HOUR ENDURANCE TEST

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ONE BILLION

CONTINUOUS REVOLUTIONS...



TO ASSURE DOUGLAS DC-8 RELIABLE *FAIL-SAFE* PERFORMANCE!

Twelve explosion-proof Pesco Fuel Booster Pumps in each Douglas DC-8 Jetliner typify Pesco's engineering capabilities for jet-age dependability. Lab-tested... and flight-proven... these rugged pumps in a severe 3,000-hour endurance test with a 10% dry run showed a negligible .0008" total wear! Developed for submerged operation, these two-part pumps offer a special Pesco plug-in design to meet a requirement for separation of pump and motor from the scroll for periodic inspection regardless of fuel level. Over-heating is positively precluded by a super-sensitive thermal protector which operates when motor temperatures exceed 350° F. Pesco Products... leading producer of aircraft/missile components... offers creative engineering for the space age, backed by coordinated production teamwork to meet customer delivery schedules. Write us today about your requirements.

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Pesco proudly supplies these pumps for the Douglas DC-8. Shown here from left to right are Pesco Fuel Booster Pump (12 units), Main Engine Fuel Pump (4 units), and Water Injection Pump (4 units).

**PESCO PRODUCTS DIVISION
BORG-WARNER CORPORATION**

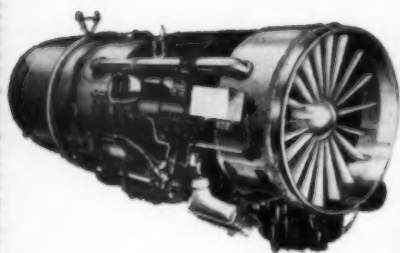
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DC-8 WITH A DIFFERENCE



IN EARLY 1960, TCA WILL FLY THE FIRST ROLLS-ROYCE POWERED DC-8 IN THE WORLD!



This is the mighty Conway by-pass engine . . . pioneered by Rolls-Royce for civil aviation use. Other manufacturers are now designing their own "by-pass" or "turbo-fan" jet power plants.



For long range routes, TCA chose the Douglas DC-8 because of the many years of Douglas experience in commercial airframe construction. TCA selected the Conway "by-pass" engine for its reliability, power and economy.



The all-turbine fleet . . . all Rolls-Royce powered has selected the Vickers Vanguard, a large, fast prop transport for high density routes and the famous turbo-prop Vickers Viscount on shorter routes.

BY 1961 **TRANS-CANADA AIR LINES**
WILL BECOME THE WORLD'S FIRST
MAJOR INTERCONTINENTAL AIRLINE
WITH AN ALL-TURBINE FLEET!



Hector Resigns CAB Post

With the blunt assertion that civil aviation is "hobbled by a regulatory system which does not work," Louis J. Hector suddenly and unexpectedly resigned as a CAB member and is resuming law practice in Miami (see *Personal View*, p. 9). Highly regarded by industry officials, although they didn't always agree with him, Hector was noted for his dissents and his insistence on less federal regulation (*AIRLIFT*, July). He was voted one of the five top CAB members of all time in an *AIRLIFT* poll in August. Hector gave his views on regulation to the President in a 70-page memorandum accompanying his letter of resignation. The President said he was turning it over to the Secretary of Commerce "under whose direction a general study encompassing the whole subject is underway."

Durfee Hearings Blocked

Political maneuvering blocked Senate hearings on nomination of CAB chairman James R. Durfee to a U.S. Court of Claims judgeship until after the first of the year. Delay was requested by Sen. William Proxmire, Democrat from Durfee's home state of Wisconsin. Although Proxmire said only that he wanted more time to study the nomination, Wisconsin politics are believed to have played a part. A Republican-controlled Wisconsin Senate this year rejected nomination of a Democrat to the state public utilities commission once headed by Republican Durfee. The Madison *Capital Times*, where Proxmire used to work, then urged him to block the Durfee judgeship. The paper last year printed details of trips by Durfee and others to Pinehurst, N.C., and Mexico. Pinehurst trips allegedly were paid for by Flying Tiger Line and Overseas National Airways. The Mexico trip was an Eastern Air Lines' inaugural. Durfee is expected to take an interim appointment to the court until Senate action.

Lewis Moves Up at PAA

The No. 2 man in Pan American World Airways is now Roger Lewis, who was elected executive v.p.-administration in an executive shakeup. Lewis, formerly executive v.p.-development and defense projects, will coordinate head office activities with respect to all operating divisions, except the guided missiles range division, and will have the same responsibilities for system traffic and sales. Other changes: John C. Leslie, former v.p.-administration, elected v.p. and assistant to the president; Samuel F. Pryor, former v.p. and assistant to the president, elected v.p.; John B. Gates, former v.p.-finance, elected v.p.-development.

MATS Contracts Total \$37 Million

Overseas airlift contracts totaling \$37 million, with about two-thirds going to Overseas National Airways, were awarded by Military Air Transport Service for the year beginning Oct. 1. ONA's four contracts, covering carriage of passengers across the Atlantic and Pacific, totaled \$23,987,48. Other contracts, for passengers and cargo, went to Buck Airways, \$5,845,057; Alaska Airlines, \$1,027,793; Capitol Airways, \$1,432,407; Hawaiian Airlines, \$518,391; Seaboard & Western, \$4,039,520. ONA has leased eight DC-7s, formerly owned by American Airlines, from General Aircraft and Leasing division of General Dynamics. Planes are being converted to high-density 95-seat configuration by Hayes Aircraft Corp., Birmingham.

MATS withdrew a request for bids on airlift of 100 tons

of cargo monthly U.S.-Europe. Instead of using contract flights, MATS will move the cargo on regular services of scheduled Atlantic carriers. Four airlines had claimed this method would cost the government less (*AIRLIFT*, September).

4 Lines Order Equipment

Three international carriers and one U.S. line have ordered new aircraft. Iberia, Spanish line, signed a contract for three turbofan Douglas DC-8s. Aloha Airlines placed a \$2,161,500 order for three more Fairchild F-27s; Canadian Pacific is buying two more Bristol Britannias, increasing its fleet to eight. Alitalia was reported to have ordered four twin-jet French Caravelles for delivery next year, with option on four more.

F-27 Price Increased 10%

Price of the Fairchild F-27 turboprop has been increased 10%. Formerly, flyaway price of F-27A with RD47 engines averaged about \$750,000; F-27 with RD46s about \$690,000. Several features that have been optional in the past, and certain other improvements, including gross and landing weight increases, are included in new price.

Congress: Little Action on Aviation

There was little action on aviation legislation in the first session of the 86th Congress, ended last month. Here is the record:

Airports: Federal aid suffered a setback. Economizers defeated a \$575 million four-year program, extended aid for two years at present \$63 million a year level.

Transportation tax: Half of the 10% passenger tax is to expire next June 30. But this could be upset by up-coming House Ways and Means Committee study aimed at broadening the entire tax base.

Financing: Legislation passed to facilitate loans for jet and turboprop aircraft, by transferring liability for leased engines and propellers from the manufacturers leasing the equipment to the airlines using it.

FAA Administrator: President was authorized to restore Lt. Gen. E. R. Quesada's rank, retirement pay and privileges when he leaves the agency.

There was no action on two important proposals: government-guaranteed loans for development of an all-cargo aircraft, and expanded airlift of all classes of mail. Although the latter did not pass, Senate Post Office Committee went on record as stating that the Post Office has authority to expand airlift of mail without new legislation. These proposals may come up again in the second session.

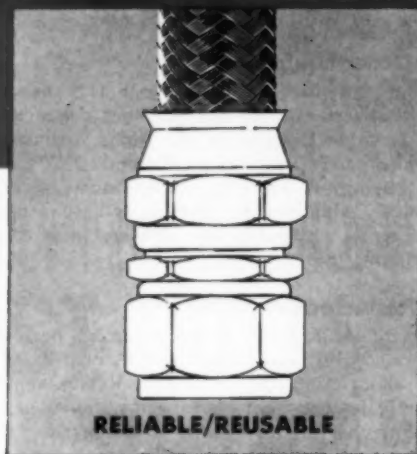
ALPA Fines PAA Supervisory Pilots

Fines of \$5,000 each were assessed by Air Line Pilots Association against 17 Pan American World Airways supervisory pilots who flew the first Boeing 707 Atlantic jet schedules before the airline and union had agreed on a new contract. The pilots, who were also suspended from ALPA for two years, have until Nov. 15 to pay.

GE Develops Aft-Fan J85

Aft-fan version of its J85 jet engine, designated CF-700-1, is being developed at General Electric's small aircraft engine department, Lynn, Mass. Designed to power light and medium aircraft, the engine will develop 4,000 lbs. thrust. Program calls for production of engines by mid-1961, FAA certification by early 1962.

The Aeroquip Reusable Fitting for Military and



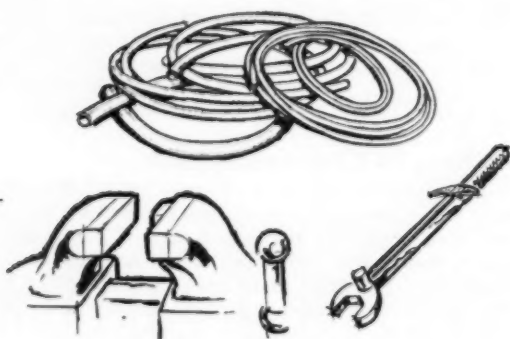
"... the logistics structure must have the inherent flexibility to respond quickly to the unexpected ..."

"... we (USAF) desire to minimize the amount of stock in the system (Spares not only are costly, but become obsolete quickly) ..."

quotes from "Logistics in the Space Age," by Maj. Gen. Frank A. Bogart, Dir. Plans and Operations, AMC, (now retired) reprinted by permission of AIR FORCE magazine, November, 1958.

1 Emergency Repairs Are Practical

Even at a remote air base, on-the-spot replacement of damaged hose lines is quick and simple when reusable fittings are used. The fittings needed are actually carried on the aircraft. They are the reusable fittings from the old hose lines. Bulk hose and a few simple hand tools are all that are needed to make replacement hose lines that get the aircraft back in the air in minutes.



No special tooling or swaging equipment is required. Only ordinary bench tools, always at hand, are needed to make replacement hose lines of Teflon when reusable fittings are used as original equipment.

2 Reusable Fittings Simplify Logistics

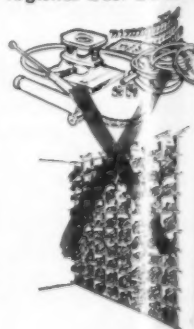


Pictured above are typical hose lines for a single engine installation. Imagine the thousands of different hose lengths and special end fitting configurations used throughout the services. How can the problem of logistics best be solved?

NOT with permanently attached swaged-type fittings because they make quick field repair of hose lines impossible.

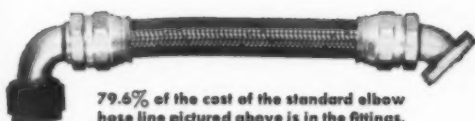
NOT by stocking made-up hose lines, for this approach is unnecessarily costly and complicates logistics.

SOLUTION — Aeroquip "super seam" Reusable Fittings and bulk hose provide the perfect solution for hose lines of Teflon just as Aeroquip-designed reusable fittings have become the military standards for rubber hose lines.



For Hose of Teflon is a Must Commercial Applications

3 Reusable Fittings Save Millions of Dollars



These examples show that fittings can be the major portion of hose line cost. When fittings are reusable, hose lines may be repaired using the same fittings. Savings are made each time the fittings are reused, and Aeroquip "super gem" Fittings may be used again and again.

Millions of hose lines of Teflon are now in service and millions more will be added on new equipment in the future.

When replacement is necessary why incur millions of dollars of unnecessary expense by scrapping permanently attached hose fittings?

4 War Experience Proved Reusable Fittings Best

The advantages of the reusable fitting are so important that these fittings were used on the 300,000 U. S. military aircraft built during World War II.

Early in World War II, the then Army Air Corps, by directive, standardized on Aeroquip Hose Lines with Reusable Fittings. In order to supply the requirements, Aeroquip gave licenses, without compensation, "for the duration" to six competitive companies. This standardization resulted in the familiar AN-MS standards for hose and reusable fittings.

In the event of another national emergency, peacetime standards of supply will of necessity again be overhauled and streamlined. The ability to effect prompt repair will be limited by time and availability. In this situation, the reusability concept in hose and fittings will again assist in reducing the number of grounded aircraft and missiles, thus having the effect of multiplying the number of operational units at any given moment.

**Specify Aeroquip Patented*
"super gem" Reusable Fittings
and Aeroquip Hose of Teflon.**



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AEROQUIP CORPORATION, WESTERN DIVISION, BURBANK, CALIFORNIA
AEROQUIP (CANADA) LTD., TORONTO 19, ONTARIO

Teflon is DuPont's trade name for its tetrafluoroethylene resin. "super gem" is an Aeroquip trademark. *U.S. Patent Nos. 2,833,567 and 2,731,279

Port Authority Quits NATCC

A squabble over aircraft noise programs led to resignation of the Port of New York Authority from the National Air Transport Coordinating Committee, the industry's anti-noise group. PNYA cited differences between its "perceived decibel" plan and NATCC's preferential runway approach to the noise problem. NATCC had branded PNYA's monitoring and reporting of anti-noise "violations" as "so misleading as to be damaging to the entire industry effort toward reduction of the problem." It said its own study of 343 of the Authority's jet "violations" showed only 21% prompted complaints to NATCC. Jet noise has actually been a problem secondary to noise from many large piston planes, it added.

Target of NATCC's attack was PNYA's monitoring of Idlewild jet takeoffs according to sound levels in nearby communities, and reporting of flights exceeding 112 perceived decibels. PNYA said airlines had a 74.7% compliance record in August, but that American's 64.3% was "completely unacceptable" and the company was conducting operations in "wilful disregard of the public welfare . . ." Said NATCC: "There would be less confusion and there might be more result if the airport operator would not endeavor to form and enforce rules in an area which has logically been reserved to federal jurisdiction."

Pacific, WAL Honor Credit Cards

Two airlines are now honoring credit cards other than the industry's own Universal Air Travel Plan (*AIRLIFT*, September). Hilton Carte Blanche is honored by Pacific Air Lines and Western Air Lines, and the latter also honors Diners' Club, all for on-line transportation. Collection fee paid by the airlines to the clubs is 4%. PAL, which started several weeks ago, is reported doing about \$5,000 worth of business a month from the Hilton card. WAL, which said it is honoring the cards to "broaden the travel-credit base," stated that authorized travel agents will earn full airline commission on all credit card sales. When an agent sells a domestic trip to a cardholder, WAL pays 4% to the club and 5% to the agent. Other lines have opposed cards other than UATP, but there has been speculation that competition may force some of them to change their position.

FAA Makes Traffic Controls Permanent

Positive air traffic control over three transcontinental airways has been made permanent by FAA, despite Air Force objections that it would "unduly hamper" USAF operations. The airways, 10 miles wide between 17,000 and 22,000 ft., link New York and Washington with Los Angeles and San Francisco. New special civil air regulation (SR-424B) requires full IFR flight planning and operations on the designated routes, forbidding VFR, including VFR on-top.

FAA also tightened up on temporary airspace reservations for military missions to provide more civil airspace, particularly for the increasing number of jet transports flying above 24,000 ft.

6 Airline Unions Oppose Teamsters

Six air transport unions formed a coordinating committee to combat both the Teamsters' organizing efforts in the

air cargo industry and the six-airline mutual aid pact. They will meet in Washington next month. The group will: (1) extend aid to each other in organizing new workers and in maintaining present membership, particularly in view of the Teamster efforts, (2) arrange future contracts to expire simultaneously so as to be able to exert a unified bargaining effort, (3) settle jurisdictional disputes, chiefly the pilot-flight engineer controversy, (4) study airline safety problems, (5) determine effect of new labor law on airline unions. Members are International Assn. of Machinists, Air Line Pilots Assn., Flight Engineers International Assn., Transport Workers Union, Brotherhood of Railway Clerks, Air Line Dispatchers Assn.

Briefs

New commercial sales director of Douglas Aircraft Co. is J. R. McGowen, who also continues as coordinator of the DC-8 program. He succeeds Nat Paschall, who resigned because of pressure of personal business. Paschall continues as a director and adviser to the president.

International jet service will be inaugurated by TWA between New York and London on Nov. 23 and New York-Paris Dec. 3. London flights will continue to Frankfurt, Paris flights to Rome. TWA Boeing 707 Intercontinental will have 32 first-class and 102 economy seats.

Turbine fuel contracts for DC-8s and Electras were awarded by Northwest. Pure Oil has five-year contract at Chicago, Milwaukee, Minneapolis and Fargo; Atlantic Refining at Washington, New York and Miami; Texaco at Atlanta; Shell at Billings, Spokane, Tokyo, Portland and Seattle; Caltex at Okinawa; Esso at Taipei and Manila. Esso won one-year domestic Electra oil contract. DC-8 oil contract has not been signed.

Big shift from Chicago's Midway Airport to O'Hare Field is planned by United Air Lines. On Oct. 25, end of daylight time, UAL will shift schedules to provide for 51 daily flights into O'Hare, only 26 into Midway. Change was prompted by start of DC-8 service.

Beechcraft Model 33, new four-place single-engine business aircraft, made its first flight (*AIRLIFT*, September). Powered by a 225-hp Continental IO-470-J engine, plane will be marketed in the \$20,000 category. Deliveries will start in mid-November.

Maximum operating weight of the British Comet 4 and 4C jets has been increased from 158,000 lbs. to 162,000 lbs. without any increase in tare weight. Range will be upped by 220 statute miles with capacity payloads.

World-wide survey of used aircraft market is being made by the State Dept., at request of the Commerce Dept. All U.S. diplomatic posts abroad are making market research studies in their areas.

Central Airlines dedicated its new hangar and office building at Amon Carter Field, Ft. Worth.

A name change is planned for REAL, Brazilian airline. New name: Aerovias Brasilia, in honor of the new capital city being built in the center of the country.

First stamp ever issued to commemorate the annual assembly of International Air Transport Assn. will be placed on sale Oct. 12 by the Japanese post office. IATA meeting opens in Tokyo on that date.

Piedmont's "all-weather" capability

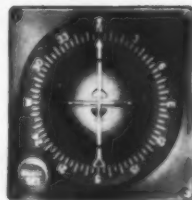
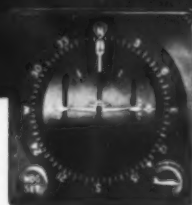


ONE OF PIEDMONT'S NEW FLEET OF F-27'S

*Piedmont Airlines maintains schedule with Lear CIS-100/L-5B autopilot combination**

Piedmont can be proud of their growing reputation for on-time operation under adverse weather conditions. This is particularly impressive in view of the high take off and landing frequency of local airline service. Operating from small airports and high density areas, over short distances with minimum ground times, imposes heavy demands on pilots and equipment. Lear's Command Instrument System (L-I-F-E)* combined with the Lear L-5B autopilot assures unparalleled *all-weather* capability.

**Lear Integrated Flight Equipment—another Piedmont Airlines first!*



NAVAL DIRECTOR

(TOP PHOTO)

Combines director information with attitude, heading, and glide slope references.

SITUATION DISPLAY

(CENTER PHOTO)

Logical, orderly display of direction and relative position to VOR/LOC course and glide slope.

AUT PILOT CONTROLLER

(BOTTOM PHOTO)

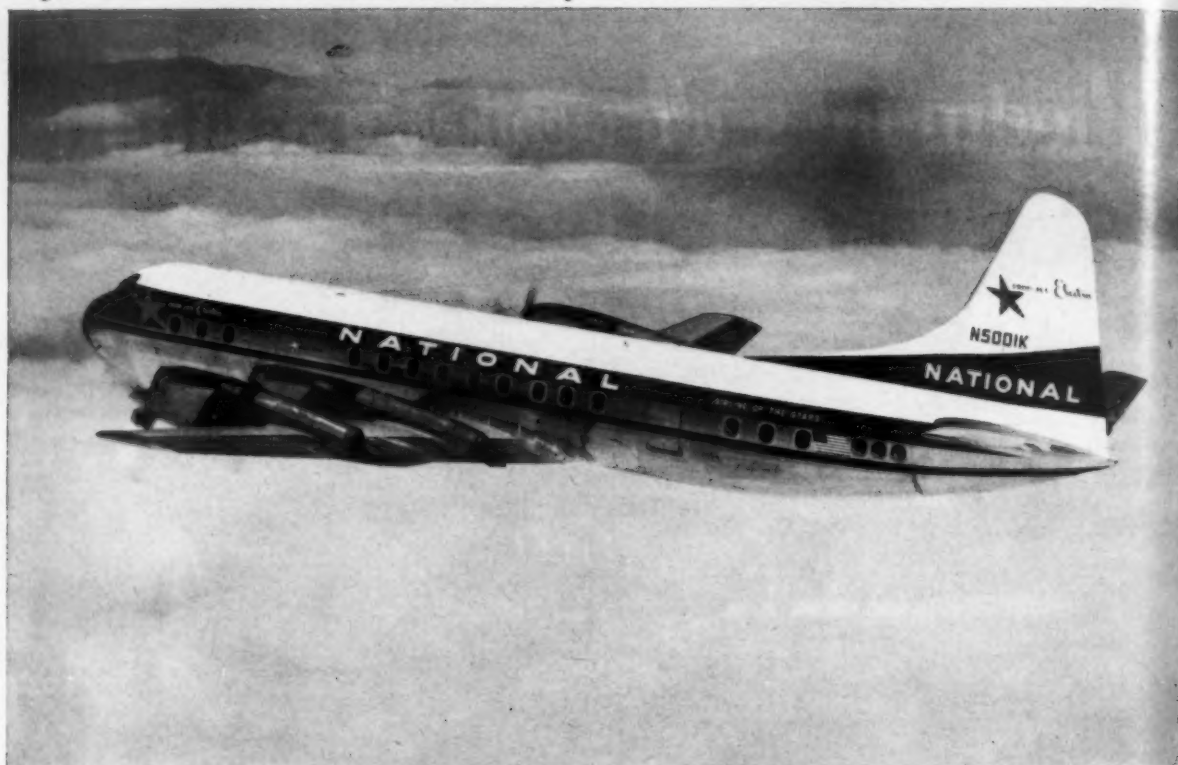
Combines push button flight control and mode selector functions.



LEAR TRANSPORT SALES

LEARCAL DIVISION • 3171 SOUTH BUNDY DRIVE, SANTA MONICA, CALIFORNIA

LC-5



National Airlines — first with pure jets in the U. S. A. — now offers air travelers jet-powered Lockheed Electra service! National's Electra flights now serve Miami, Tampa,

Havana, New York and Boston. Other cities will be added to National's Electra route as delivery of the ordered prop-jets is made. National's Electras are Texaco lubricated.

Turbo-Prop engines

ON NATIONAL AIRLINES' ELECTRAS

Lubricated with Texaco

The mighty turbo-prop Allison engines that power National Airlines' Electras — now in service between Boston-New York-Miami-Tampa and Havana—are lubricated exclusively with Texaco, for three important reasons:

- **Flight proved.** Texaco Synthetic Aircraft Turbine Oils combine all characteristics essential to jet service: low viscosity at low temperature; low volatility; oxidation resistance and thermal stability at high temperature; non-corrosiveness to engine metals; and excellent gear load-carrying ability.
- **Refinery sealed.** Because Texaco Aircraft Turbine Oils must meet highly critical tolerances, Texaco takes special precautions in packaging and handling to make sure they're in "mint condition" until the moment they're used. Packages are refinery-sealed and clearly marked to minimize chance of misapplication.
- **Demonstrated quality and service.** Texaco has lubricated National's piston-engine planes since 1938. That's

a total of 258,350,300 airline miles lubricated with Texaco Aircraft Engine Oil exclusively.

For complete data on Texaco aviation fuels and lubricants, contact any one of the more than 2,300 Texaco Distributing Plants, or write Texaco Inc., *Aviation Sales Department*, 135 East 42nd Street, New York 17, N. Y.

Tune In: Texaco Huntley-Brinkley Report, Mon.-Fri.-N^o C-TV



TEXACO
LUBRICANTS
AND FUELS

FOR JET, PROP-JET AND PISTON-ENGINE AIRCRAFT

AIRLIFT

What's Different About the DC-8?

By JOSEPH S. MURPHY

A THREE YEAR LONG manufacturers' sales competition between Seattle and Santa Monica turned into an airline operational competition two weeks ago as the second of two "king-sized" U.S. jets—the Douglas DC-8—entered service.

Its competitor, the Boeing 707, had been around a full eight months before. Passengers persistently demonstrated their liking for it to the tune of 90%-plus load factors. As the direct competition between the two jet giants became more imminent, industry speculation reached new highs on the relative merits of each and what might be the outcome for the airlines operating them.

What about speed? Economics? Reliability? Surely the answers here won't become evident for months, perhaps a year. It might be that the results will never show, except perhaps as carriers reorder jet aircraft, when and if that occasion arises.

What about the aircraft? Are they two of a kind? Has Douglas come along a bit later with more of the same? Here the answers are more tangible and—right or wrong—the Santa Monica transport builder has gone far out of his way to make certain the answer in each case is "No."

What's different about the DC-8? Virtually everything except the engines. It looks different. The nose inlet scoops, greater fuselage-to-ground clearance, bigger windows immediately distinguish it from its competitor to the educated aviation eye.

But what about the passenger who couldn't care less about such geometry. Here Douglas has worked even harder at making an impression, hopefully a lasting one, of big differences.

The Santa Monica strategy obviously was an all-out effort in the one area where the airline passenger spends more than 95% of his time—the cabin seat.

The result: Douglas' unitized Palomar seat, which has already topped an industrial design award, appears headed to win wide passenger acclaim. At least that was this writer's reaction to the first encounter with it in a recent DC-8 press flight out of Baltimore's Friendship International Airport.

There is no doubt but that the DC-8 interior impresses the passenger that the airplane was designed for him, not for the convenience of the planebuilder or the airline. Everything he needs is part of the seat, is right where he wants it, and he has no trouble using it.

The reading light is his own, right over his shoulder. The lights are fluorescent. Food tray, call light, oxygen mask, even the fresh air outlet is built into the back of the seat ahead within easy reach. The fresh air outlet im-

DIFFERENT LOOK . . . Airscoops in the nose



DIFFERENT HANDLING . . . Landing gear that casters



DIFFERENT INSIDE . . . Douglas' unitized seat



pressed us most as it enables the passenger to get maximum benefit from the outlet, a feature sure to be welcomed particularly during ground delays or low altitude holding operations when cabin airflow in transports has been notoriously deficient.

Douglas' aim was a lasting impression on the passenger of a first ride in the DC-8 and based on the merits of the Palomar seat alone, it could well prove a direct hit. If it is, it's our guess there won't be an airline seat in a first-line aircraft without its features five years from now.

Turns on a dime

The other major facet of the DC-8, one that will prove more noticeable to the airline than the passenger, is ground maneuverability. After the landing roll at Baltimore, the Douglas test crew wheeled the big jet into a 180-degree turn on the runway and taxied off with the apparent flexibility of a piston transport.

The explanation is a new item from Douglas' bag of design tricks in the form of a castering aft wheel arrangement on the DC-8's main landing gear. But from our one-time experience both on the runway and at the terminal, it could prove a feature that will cut sharply into the fuel-consuming ground time of the big jet.

In other design areas the DC-8 is different, but the pros and cons of the differences are such that the passenger probably never will be concerned unless one manufacturer in his performance estimates proves to be all wrong and the other all right. Economically, for the most part, any direct comparisons between the DC-8 and its competitors always will be hampered by the variations that persist in airline accounting practices.

Here's how the major design differences shape up. Dimensions: The DC-8 is the biggest of the jets, its 150' 6" of fuselage is only four inches short of being 12 ft. longer than the Intercontinental version of the 707, and 22 ft. longer than the domestic 707-120. Wingspan is 139' 9" (will be extended to 142' 5") compared to 130' 10" for domestic 707s and 141' 6" for international versions. Fuselage diameter is 12' 3", an inch narrower than the 707.

Fuselage Height: The DC-8 stands 5' 9" clear of the ground compared to 4 ft. for the 707 and 4' 8" for the 707 Intercontinental, a noticeable difference.

Wingsweep: Here it's 30° sweep for the DC-8 against 35° for the 707, probably the most talked about difference between the two jets. Douglas has come up with a combination of three different airfoils, one with negative camber

at the root, a 12% thick wing midway between the root and tip and 10% thick in the tip area.

Douglas engineers maintain this special combination will give the DC-8 satisfactory stall characteristics yet will achieve essentially the same Mach Number compressibility drag rise as competitive designs although it has 6° less sweep and 2% greater wing thickness.

And Douglas has two significant changes coming up for the wing. One is a new wing tip which adds 16 inches on each side. This will extend the area of the DC-8 wing from 2,750 to 2,770 sq. ft. and instead of being squared off in the customary manner as on the first airplanes delivered to Delta and United, the tip will be elliptical in shape in accordance with a new design development stemming from studies originated in Great Britain and confirmed by Douglas in the wind tunnel.

The second change to be made is the installation of leading edge slots in the wing to improve takeoff performance.

Speed: Douglas acknowledges the JT3 DC-8 with no slots and present wing tips is 10 mph slower than the JT3 powered 707 but has a campaign going to bring it up to 707 cruise. With the slots, new wing tips, etc., the DC-8 will have different specs. and different payload. The present DC-8 is approved at 265,000 lbs. maximum gross, presumably will go to 273,000 lbs. with slots. JT4 powered DC-8s are slated for approval before the end of 1959, Rolls-Royce Conway versions in February 1960. All will be on aircraft with slotted and extended wings.

Longer fuselage—higher capacity

Capacity: The longer fuselage section of the DC-8 gives it a marked edge in capacity. Domestic DC-8s will be able to seat 129 passengers in a combination first-class and coach layout compared to 112 in domestic versions of the 707. Assuming high load factors in both aircraft, the difference should have a marked effect on seat-mile costs. In high-density versions (yet to see any service), the DC-8 is designed to accommodate 176 passengers 6-abreast, whereas the 707 would handle 147 with a similar layout.

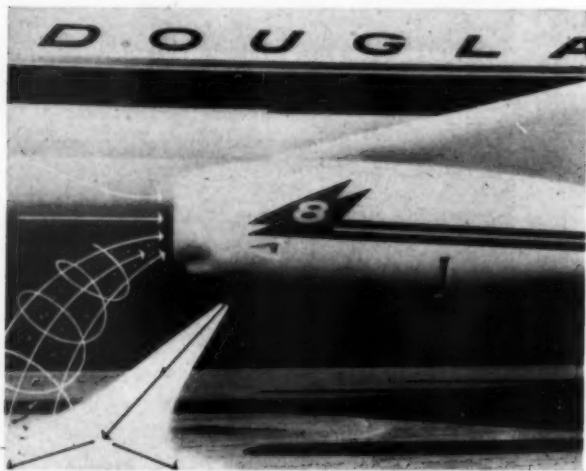
Landing gear: The big difference in gear design is Douglas' castering aft wheels on the main landing gear. This provides a minimum wingtip turning radius of only 91 ft. compared to 101 ft. for smaller versions of the 707 and up to 109 ft. for long-body versions of the Intercontinental.

The castering wheels remain locked in tandem position until the nose wheels make a 45-deg. turn at which time the castered rear wheels trail the natural path of the turn. When the nose gear is again straightened, the aft wheels become locked in tandem.

Blowaway jet: Another Douglas development for the DC-8 is a built-in jet of air on the underside of each engine pod to prevent formation of the vortex that draws foreign objects into the intake of jet engines. Douglas has completed several thousands of hours of tests and operational flying to date without a single incident of compressor damage from debris.

At the request of the U.S. Air Force, Douglas installed the "jet" on 18 B-66s and since returning to service they accumulated about 2,000 hrs. of engine operation without damage. In the same period, five B-66s not equipped incurred major engine damage traced to foreign object ingestion.

Although initial commercial jet operations experienced no airport debris damage, in recent months the problem has become more serious. Of three engines removed to date by one airline, two were traced directly to such damage, a good indication that the "blowaway jet" may prove another big difference on the DC-8.



Douglas' "blowaway jet" keeps foreign particles from being ingested, helps guard against costly jet engine damage.

6-Part Recipe For Jet Success

A guest editorial by
United Air Lines presi-
dent W. A. Patterson.



IT IS A HIGHLY significant fact that scheduled air transportation today represents almost one-half of all intercity common-carrier travel in the U.S. The maturity of the industry implied by this accomplishment carries with it a very real responsibility and also vast opportunities for future service to the American public.

These opportunities are shared not only by airline managements and employees, but also by aircraft manufacturers and their employees, by labor union leaders, by the people in federal and state regulatory authorities, and Congress.

In the past four years I have been particularly impressed by what people, working together toward a single worthwhile objective, can accomplish. I have seen the Douglas DC-8 conceived, planned, produced and flown. I have been kept intimately informed of the vast complex of preparations necessary in our own organization—some which have involved literally thousands of decisions and actions, others which have required cooperation by and with many, many people outside our industry. I like what I have seen.

I feel that the air transport industry requires this same sort of concerted effort if we are to live up to the future.

First, let's take this opportunity of giving the traveling public the maximum incentive to travel by air. We have all heard frequent references to "the great mass market" for air transportation, without hearing any solid facts about that market or how it can profitably be tapped. (Lip service need not be profitable in the American scheme of things, but airline service must be profitable or it cannot survive.)

Here is an area deserving attention by the best minds in industry, not hasty experimentation or cut-throat competition under the guise of entering a supposed mass market. Is there really a mass air travel market at rates below the already bargain-rate level of domestic air coach tariffs?

I don't know the answer, and I don't think anybody else does. But somehow we should certainly find out. We are spending much time and money for research in this area.

Second, there is a real opportunity to woo more of the shippers of America to air freight. Needed to do this job is not only a cargo airplane which has been conceived with economy of operation as a primary consideration, but also with the realization that an all-cargo airplane requires an integrated all-cargo ground operation as well.

The opportunity which now faces us is to devise an air freight operation which will be profitable for both shippers and airlines at economy rates not yet achieved.

I cannot agree, however, with those who feel that at this stage of the industry's progress subsidy need be necessary in the air freight field. I do feel that the industry is indebted to the FAA and to Senator Monroney's interest and inspiration for calling attention to a growing opportunity.

We know that studies of the air freight potential have been and are being conducted; and the day is not far distant when it will be time for all interested parties to sit down together and make a careful economic evaluation of this objective of airlifting more freight profitably.

Third, the industry's labor leadership has an opportunity to exercise a high degree of statesmanship which will recognize the vital importance of building a sound economic relationship of value-given and value-received. A healthy industry will benefit employee and airline alike.

Fourth, our regulatory authorities have an opportunity to take stock of their actions in recent years and to define carefully the lines of future growth of this nation's air carriers. In this jet age "the sins of the past," if sins they prove to be, will most surely become evident in the year 1961 when competition will have reached its maximum.

It is then that we will feel the full impact and the full import of the route awards granted by CAB since 1955. The opportunity facing these authorities is to weigh carefully how today's decisions affect tomorrow's economics.

Fifth, there is a responsibility which rests with Congress to give to America the expedited mail service which has been so obviously needed. The U.S. is among the most backward in utilizing air transportation in the movement of mail. A total of 42 nations use air transportation whenever and wherever improved mail service results.

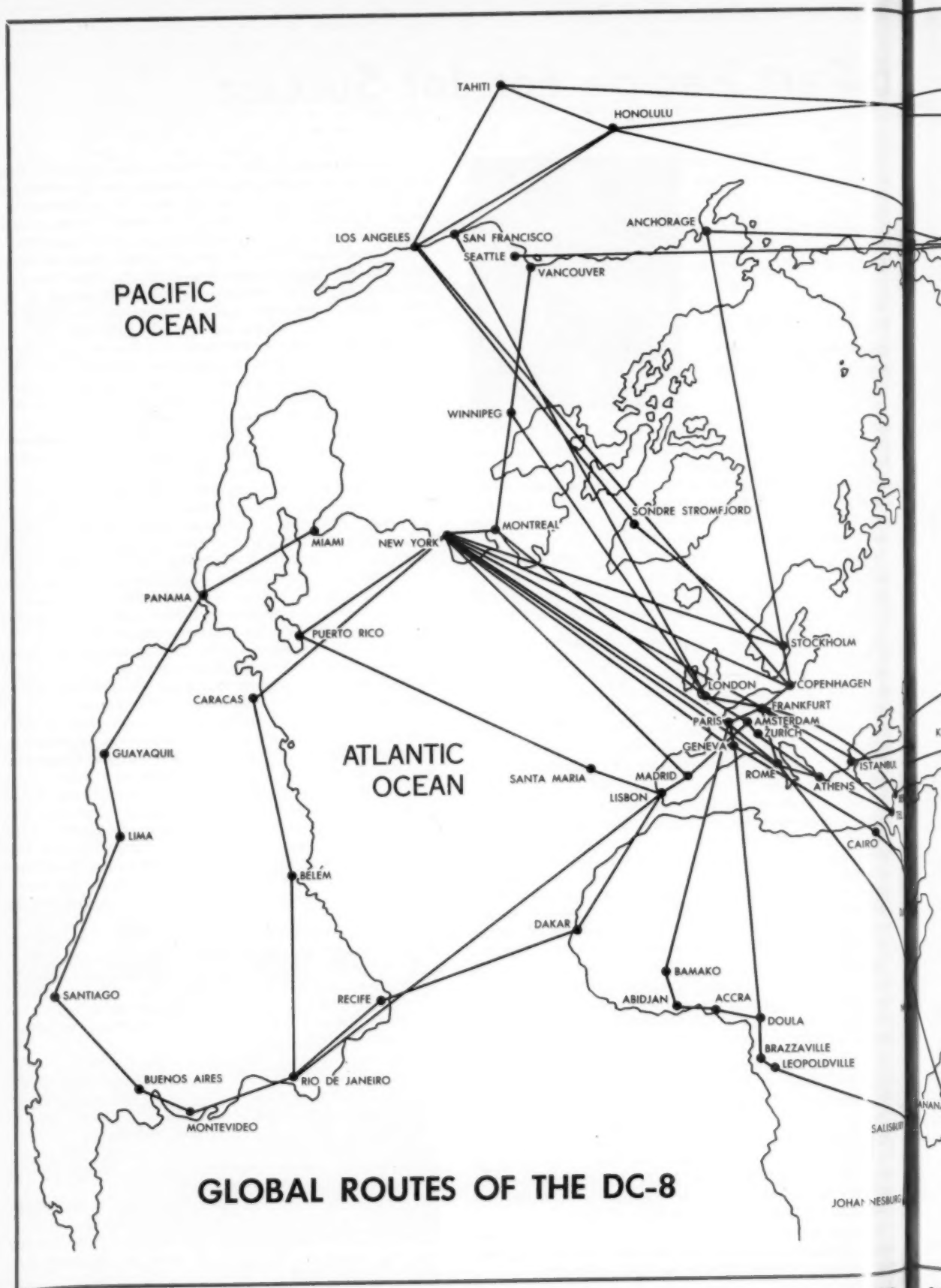
Postmaster General Summerfield's latest proposal is a step toward giving the American public what other nations have enjoyed for years. His proposal may merit modification, but in principle it is long, long overdue.

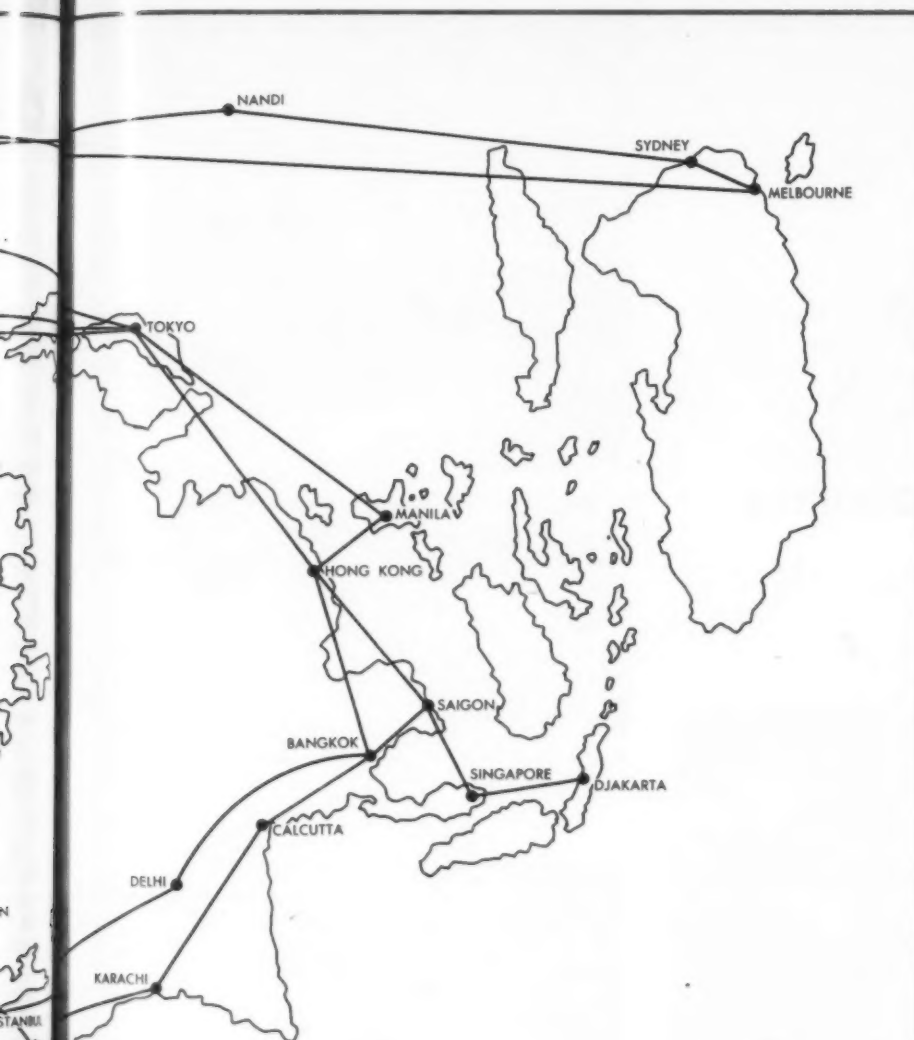
Sixth, there is an opportunity for all of us in the airline industry to become more firm in our emotions and our forward thinking. Four years ago Russia's Tu-104 made its first commercial flight and our "worriers" felt this country had been left behind in jet transports. Today we have the most modern fleet of jet aircraft in the world. But now the worriers are worrying about whether this jet fleet is too big!

In our system of enterprise each airline measures its markets and its equipment needs. It places orders for aircraft which will be delivered several years later. It must judge future demand, and the proportion of total demand which will result in revenue passenger miles and cargo ton miles that it will carry. Human judgment is important here and no airline has a monopoly.

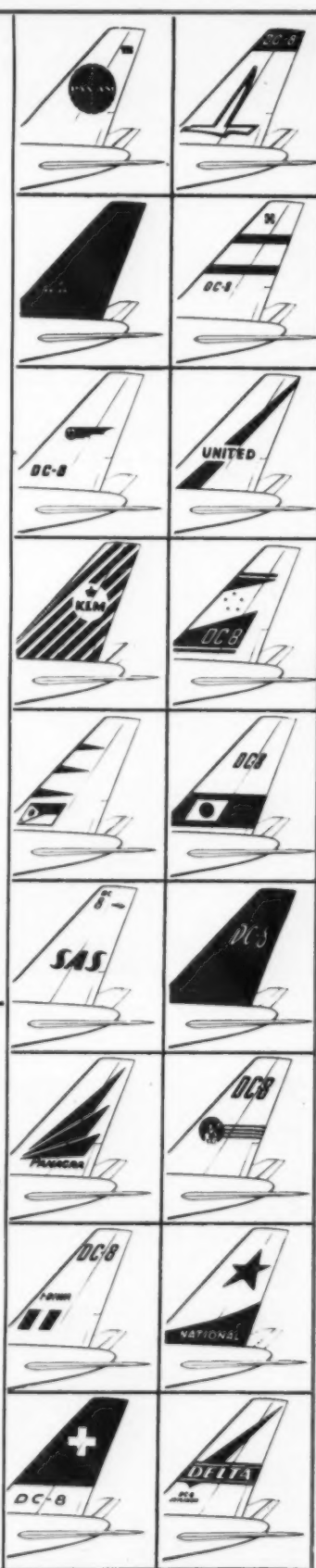
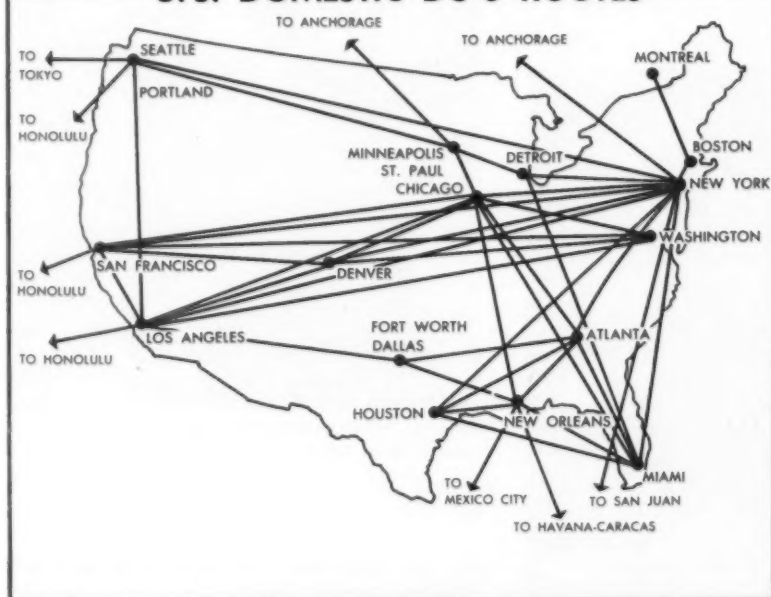
It is quite possible that actual traffic volume in 1961, for example, may not measure up to the sum total of individual airlines' expectations. Airlines which have been over-optimistic about their individual futures may face the consequences of over-planning. The industry as a whole, however, should not be judged by the excesses of any one of its members if the future proves that certain airlines have over-extended themselves.

The air transport industry faces vast opportunities which are crying for action—not seat-of-the-pants action, but considered action—which will raise it to levels of public service that will maintain and insure its place as the most progressive in the world.

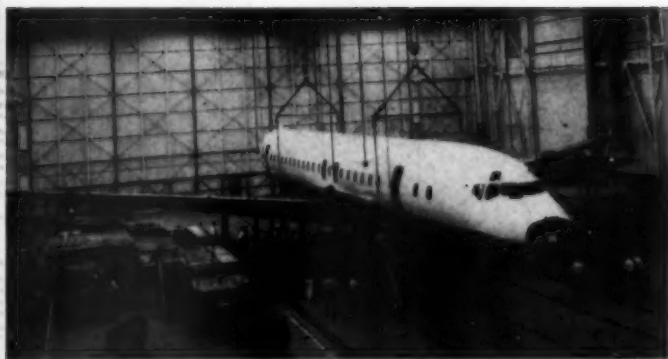




U.S. DOMESTIC DC-8 ROUTES



Growth of a Jet; The DC-8 Story in Pictures



October 25, 1957: First joining of 19,000 lb. fuselage with swept wings of a DC-8.



April 9, 1958: Roll-out of red, white and blue trimmed DC-8 at Long Beach, Calif. plant.



June 3, 1959: United Air Lines president W. A. Taft receives first DC-8 from Douglas officials.

May 30, 1958: First DC-8 takes to the skies at Long Beach Municipal Airport, Calif.



July 23, 1959: Trans-Canada Air Lines first Conway-powered DC-8 leaves Long Beach runway on maiden flight.



September 18, 1959: Passengers load United DC-8 for first jet operation between San Francisco and New York.



September 18, 1959: Delta Air Lines New York-Atlanta flight takes off in first scheduled service.

Evolution of the DC-8

- June 7, 1955: Decision reached to produce DC-8.
- Oct. 13, 1955: Pan American World Airways orders 21 airplanes.
- Oct. 25, 1955: United Air Lines orders 30 airplanes.
- Nov. 7, 1955: National Airlines orders 3 airplanes.
- Nov. 16, 1955: KLM orders 12 airplanes.
- Dec. 7, 1955: Eastern Air Lines orders 16 airplanes.
- Dec. 1, 1955: Japan Air Lines orders 4 airplanes.
- Dec. 2, 1955: Scandinavian Airlines System orders 7 airplanes.
- Dec. 2, 1955: Panagra reported to be taking over 4 of PAA's original order.
- Jan. 3, 1956: Swissair orders 3 airplanes.
- Feb. 1, 1956: Panair do Brasil announces they are taking 4 airplanes from PAA's original order.
- Feb. 1, 1956: Delta Air Lines orders 6 airplanes.
- May 9, 1956: Trans-Canada Air Lines orders 6 airplanes.
- June 1, 1956: Construction begins on DC-8 assembly plant at Long Beach, Calif.
- Sept. 1, 1956: First spar cap is milled from T-shaped extruded aluminum billet.
- Nov. 1, 1956: UAT orders 2 airplanes.
- Nov. 1, 1956: TAI orders 2 airplanes.
- Feb. 18, 1957: First assembly work on DC-8 begins.
- May 10, 1957: Long Beach assembly plant dedicated.
- July 15, 1957: Olympic Airways, S. A. orders 2 airplanes.
- Oct. 25, 1957: Fuselage and wings are joined on first aircraft.
- Nov. 1957: United boosts order to 40 airplanes.
- Mar. 6, 1958: Alitalia orders 4 airplanes.
- Mar. 28, 1958: Four Pratt and Whitney JT3 engines are attached to first DC-8 engine mounts.
- Apr. 9, 1958: First roll out of DC-8 at Long Beach.
- May, 1958: Iberia Spanish Air Lines orders 2 airplanes.
- May 30, 1958: First production DC-8 takes off from Long Beach Municipal Airport.
- Dec. 30, 1958: Northwest Airlines orders 5 airplanes.
- Apr. 1959: Philippine Airlines orders 2 airplanes.
- June 3, 1959: Douglas delivers first DC-8 to United Air Lines.
- June 29, 1959: United receives second DC-8.
- July 23, 1959: First flight of Conway-powered DC-8 for Trans-Canada.
- Aug. 31, 1959: Douglas gets DC-8 type certificate on domestic model with JT3 engines.
- Sept. 18, 1959: First scheduled service with DC-8 by United and Delta airlines.



Big view of the DC-8 cabin with built-in seat accessories. Hat racks return to original role, to store hats and airline pillows.

Inside the DC-8

Palomar Seat Decides Cabin Design

AT THE OUTSET of jet transport development, designers showed no end of concern as to how to avoid the overcrowded effect in cabins that would be carrying far more passengers than ever before.

Some turned to blocks of varied color of upholstery to break up the "tunnel" effect of a long cabin. In virtually all instances manufacturers, and the industrial design consultants they hired, placed renewed emphasis on increasing the comfort in the immediate area where the passenger spends most of his time.

Here's how Jack A. Graves, chief of the Douglas interior and industrial design section sizes up the situation:

"The industrial design approach to aircraft interiors is much the same as for any other form of transportation, with the exception of a few more rigid limitations, stemming from the fact that the shape of the passenger compartment is dictated by the need for aerodynamic cleanness, structural integrity, and economic lightness. This leaves the designer with a tube to work with as a framework for his interior.

"The problem of styling an air transport interior starts when the airplane is in its initial structural and aerodynamic design stages. The designer is constantly on guard with respect to his area of the airplane, to make sure that he has enough head room, hip room, shoulder room, leg room, floor area, window space and adequate volume for lavatories, galleys, coatrooms, baggage, emergency gear and other services which the various customers will require. The basic airplane interior must be designed to fit the needs of perhaps half a hundred different customers during the production life span of the airplane."

To see how well Graves, his colleagues and a large team of suppliers have succeeded in their effort to make the DC-8 cabin interior the last word in comfort, here's the result.

The passengers, without doubt the most important people in the air transport business, are discouraged from riding standing up, although very few express the wish to do so. In fact, they spend from 96% to 100% of their time in their seats or chairs. (In the U.S. a seat is generally a seat.

Abroad, a chair is that upon which you rest your seat.) So it is not unnatural that the design of the DC-8 chairs received a tremendous amount of thought and effort from the Douglas engineers, with the result that their final product,



The untized Douglas Palomar seat. Over the shoulder reading lights employ fluorescent lamps.

DOUGLAS

DC-8



Pilots call it...*(and so will you!)*
"The world's most advanced jetliner!"

Already, more than 500 pilots have flown the Douglas DC-8 Jetliner. Here's how they feel about the world's most modern jetliner: "It's in the DC tradition, and that's good enough for me" . . . "Remarkable approach and stability characteristics" . . . "I've flown them all and this is it!"

As a DC-8 passenger, you'll share their enthusiasm. You'll appreciate the many Douglas innovations. And you'll rely on the DC experience that has made Douglas the most popular aircraft in aviation.

Make a date with the DC-8, *world's most advanced jetliner!*

These world-famous airlines will soon fly you almost anywhere on earth by DC-8! ALITALIA-LINEE AEREE ITALIANE
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TRANS-CANADA AIR LINES • TRANSPORTS AERIENS
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UNITED AIR LINES

More airlines have chosen the DC-8 than any other jetliner!



ON THE WORLD'S
NEWEST JETLINERS



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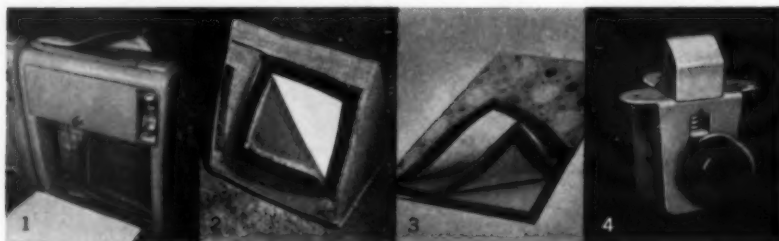
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VELCRO will outlive the fabric on which it is used, requires no special cleaning, and will open and close over 30,000 times without any substantial reduction in fastening power. Available any length, any color, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $1\frac{1}{4}$, and 2" widths.

VELCRO woven nylon tape consists of two strips that securely lock together to provide a continuous and adjustable means of fastening fabric to straight or contoured shapes. One strip is covered with stiff little hooks and the other strip with soft nylon loops. When pressed together, the hooks engage the loops and lock until peeled apart.



1 Rear view of usage on head rest and seat back with push-button tray latch on I.D.I. award winning seat ■ 2 Usage on foot rest ■ 3 Usage on carpet
■ 4 Miniature push-button tray latch designed and produced by HARTWELL



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the Douglas Palomar unitized seat, was considered worthy of a top award by the Industrial Designers' Institute. (Sharing the award with Jack Graves were Ed F. Klarquist, Harvey C. Bjornlie and Harold S. Jencks, all of the Douglas interior and industrial design section.)

The Palomar chair is, in fact, the center around which the DC-8 interior is built. And it is indeed "unit-ized." Literally built into each chair, within fingertip reach of the passenger are fluorescent reading lamps, giving individual, over-the-shoulder illumination; built-in utility tables; fully adjustable fresh air outlets; attendant call buttons and passenger oxygen systems.

The passenger system provides both first aid and emergency oxygen. The majority of the masks are stored in containers built into the Palomar seat backs. Should decompression occur about 15,000 ft., the container doors will open automatically, placing the masks within easy reach directly before the passenger. Oxygen cylinders are supplied by Zep Aero, Scott Aviation Corp., and Walter Kidde and Co., Inc. Regulators are by Scott Aviation, Alar Products, Inc. and National Welding Equipment Co., outlets by Puritan Compressed Gas Co. Masks are supplied by the airlines.

To aid the airline operators in satisfying the comfort needs of all classes of traveler, the Palomar seats are made in three models, designed to be mounted on a floor and sidewall track for rapid adjustment to the required seat spacing. A continuous sidewall armrest incorporates the feeder lines for all the built-in utilities. Each line may be plugged into the chair with a quick detach fitting for ease of movement and maintenance.

"Skyview" windows identify DC-8

An identifying characteristic of the DC-8 are the large "Skyview" windows with triple panes, a product of Rohm & Haas, Philadelphia. Human factors research convinced Douglas that these large windows, spaced as they are in the DC-8, provide optimum visibility. Each of the outer panes can carry eight times the cabin pressure. The inner pane serves as soundproofing and can also carry cabin pressure.

The DC-8 cabin pressurization and temperature control system by the Carrier Corp. of Syracuse, N.Y. is a masterpiece of efficiency with an unusually low weight factor, according to Douglas. The problems of maintaining 8,000 ft. cabin pressure when the jetliner is actually flying at 40,000 ft., with outside temperatures ranging down to 100 degrees below zero, was not a simple one.

Douglas engineers estimated that

See and be seen...

New Safety for DC-3s

when equipped with

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"We now make all take-offs, climbs and landings with the windshield heated, which guarantees us clear visibility and maximum bird resistance."

"It is gratifying to know that we are now assured of adequate visibility through the windshield under all conditions."

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Piedmont Aviation, Inc.
Smith Reynolds Airport
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Executive Aircraft Service, Inc.
Red Bird Airport
Dallas 30, Texas

PacAero Engineering Corporation
3021 Airport Avenue
Santa Monica, California

Aviation Consultants
Reading Aviation Service, Inc.
Municipal Airport
Reading, Pennsylvania

Atlantic Aviation Corporation
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Sierracote Electrically Heated Windshields give General Petroleum's executive DC-3 fog-free and ice-free visibility and insures additional bird resistance while operating from Northern Alaska to Mexico.

Sierracote windshields, canopies and cabin panels are fabricated from plastic or glass, and are easy to install. They are normally designed to operate directly from the aircraft's line voltage—eliminating the need for heavy inverters or transformers. Sierracote panels also reduce sun glare and effectively reflect infra-red heat rays.

Sierracote windshields are also available for Lockheed Lodestars and PV-1s and are being used on the T-39 Sabreliner, ZPG-2 Blimp, and De Havilland Caribou. In addition, Sierracote is used on canopies of the Convair 106-A and F106-B, side panels of the Sud Caravelle, and face pieces for pressure helmets. They will soon be available for other executive and private planes.



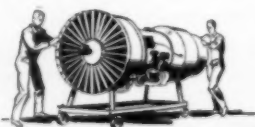
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A BIG STEP AHEAD

Pratt & Whitney Aircraft's new turbofan engine... the JT3D-1... delivers 42% more takeoff thrust and operates on 13% less fuel than the latest JT3 (J-57) jet engine.



The new engine handles 140% more air than the JT3, although basic twin-spool structure and aerodynamics are essentially unchanged. Dry takeoff thrust increases from 12,000 lbs. for the JT3 to 17,000 lbs. for the turbofan.

American Airlines has announced its fleet of Boeing 707s will be converted to our turbofan. KLM will use it in five of its twelve Douglas DC-8s on order.

POWER IS THE KEY

The key to flight achievements is dependable power. And dependable power is Pratt & Whitney Aircraft's business.

Nine out of ten of the Boeing 707s and Douglas DC-8s flying or on order are powered by Pratt & Whitney Aircraft's jet turbines. Besides its many contributions to the jet field, Pratt & Whitney Aircraft has made significant advances in nuclear aircraft reactors, solid rocket components, and liquid hydrogen rocket applications.

Flight Propulsion by **PRATT & WHITNEY AIRCRAFT**

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AIRLIFT



Douglas' "big windows" are designed to withstand eight times the cabin pressure.

nearly 30 tons of cooling would be required to keep the DC-8 passengers comfortable at all times but a conventional refrigerating system of that capacity would weigh approximately 5,000 lbs., a too-severe weight penalty.

Carrier solved the problem with the development of a compressor weighing only 11 lbs. but turning at 90,000 rpm. It is powered by an equally tiny turbine, built into the compressor case and driven by compressed air from the DC-8 engines.

The final product is two refrigeration systems, each of which weighs only 150 lbs., exclusive of the controls that regulate its operation.

The DC-8 interior is so designed that up to 16 single-occupancy upper berths may be installed in a matter of minutes. They harmonize with the general decor, are compact, light and incorporate all passenger facilities, compatible with all types of Palomar seating.

Douglas engineers were confronted with a quite serious problem in arranging adequate water supply for a potential of 176 passengers. Water for galley and lavatory service is scarce at 40,000 ft.

Exact studies by Douglas human factors groups have been able to determine accurately the amount of water likely to be consumed by various passenger loads. In the past, water supply tanks were heated by electrical immersion heaters which kept the wash water at 90 to 100 degrees, and when a passenger wanted hotter water, he merely let it run, thinking it would thus become hotter. At 8½ lbs. per gallon, precious water and weight were wasted. In the DC-8, a small flash heater located under the basin gives instantaneous heat to cold water at the touch of a button, with only one pipeline lead-

ing from the water supply tank.

The interiors of the DC-8s typify the handiwork of many of the nation's outstanding craftsmen in the field of fabrics. Among the many who help fill the specifications of the Douglas designers are the Firth Corp., carpetmakers; Collins and Aikman Corp., soft fabrics; Polyplastex United and United States Plywood Corp., partition coverings; and the Garden State Corp., leathers.

All curtains, seat coverings and carpeting are so processed that they will not support combustion. Practically all the materials are custom designed, loomed or printed to the requirements of the individual airlines. Suppliers of other surfaces include Duracote Corp., for vinyls; B. F. Goodrich, vinyl floor coverings; Formica Corp., surface coverings; and paints by Fuller Paint Co.

DC-8 overall lighting was designed by the Luminator Co. Special lightweight, easy to clean and replace bulbs are used to direct the light's beam.

The DC-8 cabin has a comfortably low sound level, permitting the use of normal conversation tone. Efficient use of modern soundproofing materials, including the Douglas-developed anacoustic windows, provides effective, consistent soundproofing. Extra-heavy skin in the aft section helps absorb boundary-layer noises.

High fidelity sound system

Available to DC-8 passengers is high fidelity music. Permanent loudspeakers designed by Douglas and manufactured by the Jensen Manufacturing Co. are installed at 40-inch spacing throughout the cabin.

The DC-8 has provision for modern galleys both fore and aft. Some are produced by Weber Aircraft, others by Nordskog. The galley areas are designed and positioned to assure minimum disturbance of passengers and to serve capacity loads swiftly. Large galley service doors are provided fore and aft on the right side of the airplane, allowing for simultaneous but independent loading of galley supplies and passengers.

One new cabin feature taking over in the jets, and the DC-8 is no exception, is a flushing lavatory toilet system. In the DC-8 the design and manufacture of this system went to Monogram Precision Industries, Inc., Wickland Mfg. Div., Culver City, Calif.

By-passing the plumbing complex typical of home flushing units, the DC-8 system employs electro-mechanical devices. Of the four to six lavatories provided in various DC-8 models, all are the "plumbed-in type" with only the bowl visible above the lavatory floor.

The flushing action, governed throughout its cycle by an electric timer, takes about 11 seconds.

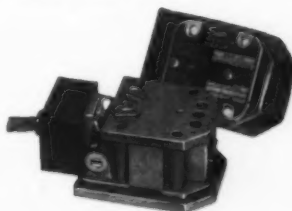
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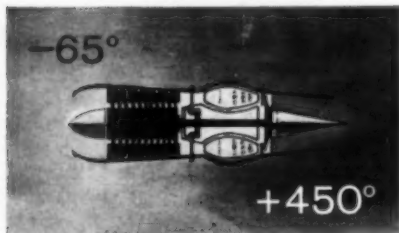


Boeing 707 jet sound suppressor

The oil that's safe through 500 degrees F: *HOW ESSO DOES IT!*

Jet age aircraft make unprecedented demands on lubricants. Not even the most highly refined mineral oils are able to cope with the temperature extremes in turbine engines. Needed was a *synthetic* oil with

good lubricity and stability at very *high* temperatures—and easy-flowing properties at very *low* temperatures. Esso was the first successfully to develop such an oil.



At an altitude of 40,000 ft., temperatures near the intake can be as low as -65° F. Yet in some of the highly-loaded bearings, with rpm up to 14,000, they may soar to 450° F.



Esso synthetic engine oils were ready *before* the first turboprop Viscounts entered commercial service. Esso Aviation Turbo Oils 35 and 15 were the first approved oils for *all* turbine-powered airliners. In fact, the development of these engines depended upon the availability of Esso Aviation Turbo Oils!

INTERNATIONAL AVIATION PETROLEUM SERVICE



KLM: Europe's Top DC-8 Buyer

By ANTHONY VANDYK

AMSTERDAM—KLM is entering the jet age with a distinction all its own. The Dutch airline is Douglas' best European customer and is the only airline that has purchased every one of the DC series, including the DC-5.

Holland's association with Douglas transports dates from 1934 when Fokker Aircraft Co. started assembling DC-2s ordered by European carriers, including KLM. The long and friendly relationship between the Dutch and Douglas was the main reason why KLM decided to buy the DC-8.

One KLM official explains it this way: "When in late 1955 we had to make up our mind which jet to buy we quickly established that there was not much difference in performance between the Boeing 707 and the DC-8. Although Boeing had a prototype flying we felt we would rather deal with a company we knew . . . we had had 21 years' cooperation with Douglas and we knew that in case of trouble Douglas stood behind us 100%."

When KLM decided to order eight DC-8s (this was increased to 12 in the middle of this year) it realized that selecting the Douglas jet meant it would be a year behind some of its competitors. KLM is scheduled to get its first DC-8 in January and six more before the end of 1960. All seven aircraft will be powered with the P&W JT4A-3. The last five, all equipped with the P&W JT3D-1, will be delivered in 1961.

The airline has been preparing for jet operations for many years. Captain J. J. Bak, head of the flight technical department and chairman of KLM's jet steering group, bears much of the load connected with new aircraft. Detailed engineering planning comes under G. Lam, head of the project office of the KLM production directorate. Hermann Westerhuis is in charge of the "Bureau Preparation Maintenance and Use, DC-8 Aircraft," and Ed Driessen, head of the Research Dept., is responsible for route studies and payload control.

These four men are responsible for integrating the DC-8 for KLM. Captain Bak has worked with Douglas to make the DC-8's cockpit as similar as possible to that of other KLM aircraft. Lam has worked with Douglas on engineering, and Westerhuis on the detailed equipment needed for operation—ground and test equipment in particular.

KLM plans that on longer stretches one of the three pilots on board will relieve the flight engineer during a certain portion of the cruise flight. All pilots are qualified navigators and can take over the duties of the flight engineer during cruise.

KLM has specified the Canadian Marconi Doppler for its DC-8s. Operational tests with this equipment on a DC-7C had worked out very well. Tests are about to start with



In front of the first DC-8 to land at Amsterdam stand I. A. Aler, president of KLM, and, on his left, J. W. Clyne, Douglas' Director of International Sales.

a navigational computer to go with this Doppler equipment. KLM is very insistent on the value of Doppler. Without it the airline does not consider there is any safety problem, but its presence will improve jet economy.

In the baggage compartment there will be tracks to enable nets to be put in as dividers. The Dutch airline does not plan to use containers. Another feature of the KLM DC-8s is the installation of two inflatable escape chutes.

A large amount of support equipment has been ordered for the KLM DC-8s but because new offers and proposals are constantly being received from manufacturers, the airline is trying to delay placing its orders as long as possible. Among the support equipment required are 60-KVA power supply units for all DC-8 stations and 75-KVA units for all stations where DC-8s and Electras will be operating.

For starting the DC-8s KLM has ordered 18 AiResearch gas turbine starters and six Atlas Copco compressed air starters. So far only one air conditioning unit has been ordered—from Hokanson in Hollywood, Calif.

Trucks on order

Two DC-7Q tractors made by the Douglas company in England (no connection with Douglas Aircraft) have been ordered. KLM is manufacturing 1,000-liter potable water carriers for the DC-8.

KLM is not sure whether it will need silencers for testing its engines on the ground but it has ordered some blast fences of its own development. KLM has also designed a special dock for the DC-8 which will be ready by October 1960. The aircraft will enter the dock nose first.

For training DC-8 pilots KLM will have a Link simulator in operation early this fall. A jet engine trainer has already been delivered by Link. The KLM navigation trainer which can reproduce all navigation problems (except astro navigation) will be helpful on training crews. It is estimated that this cuts aircraft training time by 80%.

The KLM training program for DC-8 pilots involves six to seven weeks technical and operational ground instruction, 32 hours on the simulator and 10 to 12 hours flying to check out on the aircraft. By August eight KLM pilots and eight flight engineers had completed technical and ground training at Douglas. The first flight training course will start in December in California but after that flight training will take place in Europe.

In the selection of its DC-8 pilots KLM has paid particular attention to mental alertness. The age limit is 46. Thanks to many years of paper jet operations, KLM is fully aware of what the aircraft will be able to do on the North Atlantic. DC-8 flight operating charts have been prepared on IBM equipment. Certain airports are still viewed by KLM as somewhat marginal for the big jet and improvements—mostly minor—are needed at 18 of 36 "DC-8" airports.

New Galleys Spruce Up DC-8 Meals

United's transcontinental service features two-hour-and-20-minute meal for first-class passengers. Delta, with shorter flights, peps up dinner hardware.

MAJOR IMPROVEMENTS in buffets and galleys are enabling United Air Lines to serve leisurely, course-by-course, two-hour-and-20-minute meals to first-class passengers on nonstop transcontinental DC-8 flights.

Delta Air Lines, with shorter flights, cannot use a course service, and has concentrated on improving its plates and trays. UAL will not use course service on short trips, and will introduce some new menus to cope with the jet speed.

Importantly, the DC-8 galley was "designed into" the airplane. In older equipment, galleys have been allotted space after the design was complete, often resulting in cramped, inadequate working facilities. Sufficient working space is now available.

New buffet equipment, manufactured by Weber Aircraft Corp., Burbank, Calif., helps to make UAL's elaborate first-class food service possible (the coach meal is served on one tray). Comparison of the old with the new shows the difference:

Old: In the flight kitchen, hot food was placed in casseroles, and these were loaded into containers which could be plugged into the galleys to keep them warm. Trays containing everything except hot dishes were loaded in other containers. More than a dozen individual food boxes were needed for a full load of passengers. Loading this equipment aboard the airplane was a time-consuming operation.

At mealtime, a first-class passenger received his tray, minus the casserole, and his cocktail or highball was served. Following this, the casserole was inserted. On flights not featuring liquor service, the entire meal was on one tray.

New: UAL's DC-8 has two galleys, one first-class, one coach. Large service doors, located on the right side of the aircraft so as not to interfere with passengers who enplane on the left, speed loading. Buffets, one for each galley, are



New entree and salad plates used by Delta on DC-8s form an interlocking pattern on the tray.

in only four units, and all eight units can be loaded in about five minutes.

Food is loaded in the buffets on individual plates. "The main entree is literally and figuratively steaming hot when served to passengers," Richard L. Senn, UAL's superintendent of dining service, told *AIRLIFT*, adding that this "dramatic improvement" in service was made possible by an exclusive UAL built-in buffet heating unit. These units, regulated by stewardesses, are similar to a temperature control home oven, with low heat for hold and high heat for increasing temperature. Plates are so hot that the stewardess uses a passer plate in serving—a metal tray which fits under each plate.

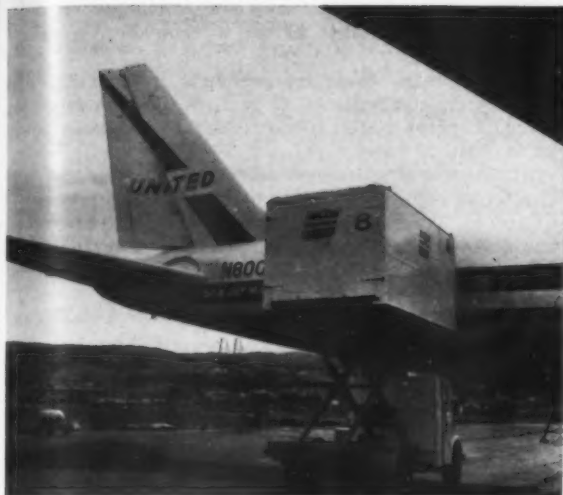
Meals are served without use of rolling carts. UAL feels that the aisle should remain open at all times.

First course is served on an ebony-colored tray, on which is a plate of hors d'oeuvres, cocktail glass and cruet, the latter containing a choice of cocktail or tomato/fruit juice. At this time, the stewardess also brings a condiment tray—a new feature—which contains beverage cup, water, whipped butter, roll, salad dressing, salt, pepper, sugar, cream and silverware. Second course is a salad served on a white plate, and this is followed by the entree on a white china plate covered with a rose-gold banquet cover. UAL has made no major change in entrees. Dessert is from a French pastry tray.

Meals are served on the individual tables that unfold from the backs of the seats. Table linens are rose-beige and mocha, silver is of Swedish design. China and silverware were designed by Raymond Loewy Associates.

Coach meal is similar but less elaborate, and is served on one tray. The multi-course meal in the 60-seat first-class compartment takes two hours 20 minutes to serve (east-bound San Francisco-New York schedule is five hours, west-bound is 5:45), coach meal (53 passengers) takes 55 min. Two stewardesses work in each compartment except during the serving of cocktails, when three handle the first-class passengers.

On UAL's shorter flights (Chicago-New York, 2:15 west-bound, 1:50 eastbound), all meals will be handled on trays, with no course service—and there will be no liquor service. Among new, speedy menus will be a soup-salad luncheon. Soup will be served in a china bowl along with a salad and dessert. Soup bowls will have a specially designed lid to prevent spilling. Lunches of this type can be served in 30 to 50 mins.



Rapid loading of DC-8 food supplies is made possible with this "elevator" food service truck built for United by Gar Wood Industries, Wayne, Mich.

serving complimentary champagne and choice of entree—steak cooked to order, Cornish hen, and fish on meatless days. Coach meals, which alternate weekly, include roast beef, chicken and Swiss steak. Same menus will be used on longer routes. Two stewardesses work in each compartment. Delta's buffets for the two galleys were made by Nordskog Co. Inc., Van Nuys, Calif.

New plates, shaped like an artist's palette, are of contemporary, free form design, honey beige in color. Two such plates, one for salad and one for entree, form an interlocking pattern against the ivory background of the tray. Both plate and tray were designed by Herman Stanley, Delta's assistant superintendent of passenger service, and manufactured by Plastic Inc., St. Paul, Minn.

Delta's entrees are much the same as on piston planes. The airline tries to avoid certain foods that can't be cooked so they will hold up—bacon, French fried potatoes and waffles, for example (hotcakes are satisfactory). Broccoli and asparagus are avoided—they're not popular and tend to have an odor.

In addition to Delta's, Nordskog is producing buffets for the DC-8s of SAS, National, Swissair and Trans-Canada. REF Manufacturing Corp., Mineola, N.Y., is producing Pan American's. Several other lines have ordered from Mansfield Aircraft Products, Mansfield, O.

UAL's galleys (first-class buffet holds meals for 60, coach can hold more than 70) include Weber inflight coffee-makers. Water from a hot water heater is forced through a packet of coffee, similar to but larger than a tea bag. Eleven cups can be prepared in a three-minute cycle. Coffee is then placed in a metal coffee service and kept warm on hot plates.

Delta (Atlanta-New York, 1:50 north, 2:10 south) is

An Hour Turnaround:

Swissair's Answer to Jet Costs

THE BIG NEW BREED of jet transports will be "like whales out of water" on the ground, says American Airlines' astute v.p. research W. W. "Bill" Littlewood. The DC-8 will be no exception to his keen observation.

Every extra minute of scheduled ground time for in-transit stops or turnarounds means money lost. The lack of the right piece of equipment to start a jet immediately when it is ready to be started soon could add up to losses far exceeding that of a reliable starting unit.

Disorganization of ramp services could be equally as costly. The jets demand efficiency and the operator that fails to produce it has a major economic struggle ahead.

Among DC-8 customers, at least one airline—Swissair—not only has recognized these operational facts of life but has set out to do something about them.

In one of the most comprehensive studies of ground handling yet undertaken for new aircraft introduction, the Swiss airline has pinned down to fine detail the demands that the DC-8 will impose upon its operation, the minute-by-minute progress of ramp operations and the exact performance of support equipment it will need to meet the task.

The Swissair project was undertaken by a nine-man study group under the direction of v.p. operations R. Fretz. It included specialists from the carrier's ground operations division (4), production engineering (2), passenger flight service division (1), and one station representative from both Zurich and Geneva.

The group came up with four basic requirements that would have to be strictly adhered to in order to maintain a 30-minute ground time at transit stations and a one hour

allocation for turnarounds, 30 minutes for "arrival" functions, 30 minutes for departure operations. The four requirements:

- Check-in deadline for passengers must be set at 30 min. before departure, i.e. a deadline that coincides with the arrival of the aircraft on the ramp.
- Mail and cargo must be ready on the ramp before the arrival of the aircraft.
- All ramp personnel and equipment must be prepositioned before arrival of the aircraft.
- Strict discipline and coordination must prevail among all staff personnel on the ramp as well as those directly connected with passenger handling.

Here's Swissair's precision schedule for ramp operations:

At two minutes before arrival, 13 different items of equipment are manned and at their stations. Ramp superintendent, maintenance crew and ground hostesses are in position.

Ground time starts with "check on," with no movement of any equipment until all engines are shut down.

By two minutes after arrival, passenger stairs, electrical and pneumatic ground power and fuel truck are in position. A minute later passengers begin to offload; air conditioning unit, food service "Telehoists," baggage conveyers and carts, freshwater cart, lavatory cart are positioned. Line maintenance begins.

At five minutes, unloading continues. Baggage cart trains begin to move to and from aircraft underneath the fuselage. At 10 minutes passengers have disembarked, cabin cleaning begins. At 15 minutes, cabin cleaning is completed, passenger loading starts.



New schemes for handling the large numbers of passengers on a single jet extend in scope from the door of the airplane back into the airplane terminal. Shown here is one of four new boarding lounges completed by United Air Lines at Seattle-Tacoma Airport, a design to be used at other airports.

The DC-8 to many carriers means obsolescence of maintenance facilities. Pictured here is new 520-ft. long hangar at Paris' Le Bourget Airport that will house three DC-8s for UAT French Airlines. Due for completion later this year, the UAT hangar will be ready for the airline's first jet in 1960.

At 24 minutes, refueling ends and trucks are removed. Freshwater and lavatory service is completed, passenger loading continues.

At 25 minutes, galley replenishment is completed and Telehoists are removed. At 27 minutes, last passenger has boarded, baggage loading is completed and pneumatic power unit is started.

At 28 minutes, passenger stairs are removed, maintenance completed, fireguard is in position and pilot starts engines. At 30 minutes, all ramp equipment has been moved out of danger area, engines are running, power units disconnected and removed, checks are off and ramp superintendent clears aircraft to taxi.



Air conditioner pictured here, produced by Air-A-Plane Corp., is part of Delta Air Lines' new ground equipment fleet. Carrier is buying starters from Boeing; passenger loading

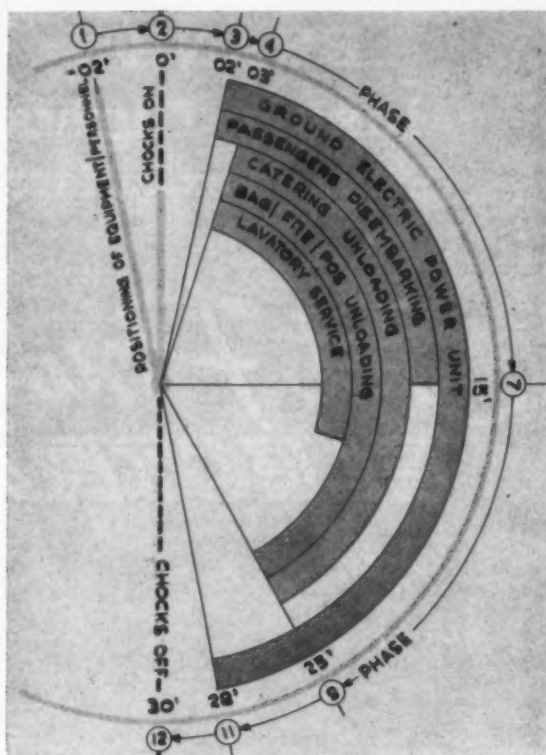
stands, water and sanitary trucks from Wollard; ground power units from Stewart & Stevenson; and tow tractors from Clark Equipment Co.

Here's what Swissair technicians specify as required equipment to permit minimum ground schedules at transit and turnaround stations:

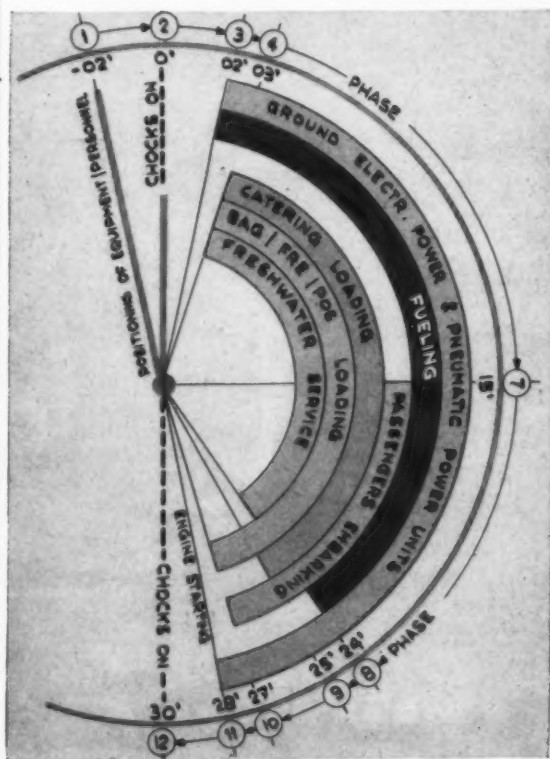
Item	No. Req'd	Estimated Cost Each	Requirements
Stairs	2	\$6,881.00	Self-propelled with service height between 98" and 165". Upper platform 158" x 138", completely covered. General dimensions: 329" to 366" L, 138" W, 193" to 256" H.
Ground Power Unit (Elec.)	1	\$ 9,200-\$10,350 (37.5 kva)	115/200 v a-c, 400 cps, 3-phase, frequency within $\pm 5\%$, voltage $\pm 2.5\%$. Capacity for vacuum cleaners, 1000 watts fused at 10 amps; 12 kw outlet for pre-heating pneumatic gpu.
Ground Power Unit (Pneumatic)		\$22,935	For starting only: flow-187 lbs./min. at 450°F, pressure 30.3 psig; 130 lbs./min. at 275°F, 35.3 psig; 164 lbs./min. at 52°F, 39.3 psig.
		\$ 9,200-\$13,000	For air conditioning/starting: flow-161 lbs./min. at 350°F, pressure 35-38 psig; 146 lbs./min. at 450°F, 35-38 psig.
Airconditioner	1	\$20,650	Trailer mounted or self-propelled. Capacity 25 to 35 ton. Heating: 300,000 to 425,000 btu.
Baggage Conveyor	4	\$18,460	Dimensions: 185" overall length, 47" width, 106" max., service height; band speed 16"/sec.
Baggage Cart	40	\$344	Dimensions 71" x 40" platform; Capacity 2,650 lbs.; weight 265 lbs.
Baggage cart tug	4	\$2,362	Mercury Truck & Tractor Co., Model 10F Mertrak.
Freshwater Cart	2	\$16,260	Dimensions: 112" L, 44" W, 71" H, 158" H with ladder extended. Trailer mounted with 250 gal. freshwater tank; Sachs 100 gasoline engine; water pump 20-25 gpm, 70 psi.
Lavatory Cart	2	\$3,680	Dimensions: 110" L, 45" W, 51" H; empty weight 1,780 lbs.; capacity: waste tank up to 300 gal.; flush tank 80 gal.; commock 40 gal.
Cabin Service Cart	2	\$3,440	Self-propelled. Dimensions: 150" L, 55" W, 57" H. Equipped with hot water container, elec. heated, 20 gal.; waste water tank 25 gal.; two refuse cans of 40 gal.; four vacuum cleaners.
Food Service	2	\$5,060	Dimensions: 161" L, 59" W, Platform height 39" min., 162" max.; lift speed: 6"/sec.; drive speed: 16 mph; weight: about 3,560 lbs.
Telehoist			
Telehoist Trailer	4	\$6,960	Dimensions: 98" L, 92" min. height, 117 max. height; 59" W.
Telehoist Container	4	\$460	Dimensions: 2.20 m. deep; 47" W, 73" H; load capacity: 1,000 kgs.

Costs are estimated, converted from Swiss francs.

Arrival eats half of turnaround pie . . .



. . . departure consumes remaining slice



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2 a.m. Brainstorm: Delta's Jetway

By GLENN HUGHIE*

AT FIVE O'CLOCK on July 22, 1959 Delta DC-8 jetliner No. 801 touched down at Atlanta Airport. Moments later it taxied into a specially-designed loading position.

In less than 20 seconds its door was open. In less than a dozen strides, visiting officials on hand for the occasion were aboard. From a second-level waiting room they had boarded the plane without walking across the ramp . . . without being exposed to weather, fumes or blast. The event marked a new era of passenger convenience.

The coming of the jets posed a major challenge to the airlines to improve terminal passenger service. In November, 1957, Delta's management decided to go to a two-level concourse with aircraft nosed in and passengers loaded directly from the waiting room. Parking positions would be on 160-ft. centers, to conserve ramp area.

Only a week earlier I had emphasized the disadvantages of this system. We had no suitable loading bridge and no assurance that one could be developed in time. And there was no opportunity to wait and see . . . we had to decide.

Advantages to the passenger were undeniable. Ramp space could be conserved to a point where the walk would be no further than to present twin-engine transports.

Management decided the passenger was entitled to the service, and the airline was entitled to the efficiency. I was assigned the task of finding a solution. I rashly promised a bridge in time to meet the first DC-8.

Tom James, one of our aircraft engineers, was assigned to help develop specifications. We sought a manufacturer who would work with us on a final design that he could produce and we would buy. In a few weeks, we began to pick up speed; then it appeared we were running 90 mph up a blind alley.

Two more engineers, Max Walker and Al Schmid, were assigned. The DC-8 was shaping up. Delivery dates were set. Terminals were being designed to take the new bridge.

*Facilities Construction Engineer, Delta Air Lines.

For me, insomnia was setting in. Then about 2 o'clock one morning as I sat in my living room wrestling with the problem, the answer suddenly came. I realized that we had been using the wrong approach. Our philosophy had been slanted toward something complicated.

Some handy shirt cardboards, scissors and glue were all I needed to get started. I roused my wife to help. By daylight we had a working cardboard model.

At the office, the bosses liked it. By night I was en route to Los Angeles armed with an idea and the name of a company about which I had heard only good reports.

Pacific Iron and Steel Corp. of Los Angeles is headed by dynamic Carl Lodjic and an able assistant, Carvel Moore. They listened to my idea, liked it, and agreed to build. Within a short time, their engineers produced working drawings for the "Jetway" needed. We placed a firm \$265,000 order for 17, conditioned on delivery of two prototypes in time to meet the first jet.

At the time it looked like they could meet the schedule, with about a week to spare. But when the first two articles were rolled out on schedule and shipped by train to Atlanta, the train was wrecked. The bridges arrived, damaged, about a week before the DC-8 was due. Replacement parts were airlifted from Los Angeles. Delta and Pacific Iron and Steel personnel worked almost around the clock to meet the schedule. We put the bridge together, but it wouldn't work.

The morning of July 22 was like countdown at a missile base. The DC-8 had taken off for Miami and the bridge still wasn't working. Both Carl Lodjic and Carvel Moore were on hand. Moore kept probing for the trouble. Each probe helped. But it wasn't until the DC-8 left Miami—only one hour and 20 minutes away—that Moore, with a can of dry lube in his hand, struck pay dirt.

Delta DC-8 No. 801 taxied up to the ramp at Atlanta. Carvel Moore pushed a button and the Jetway went out to meet her. With that meeting, the efforts of a lot of people made good a promise I had made 20 months before.

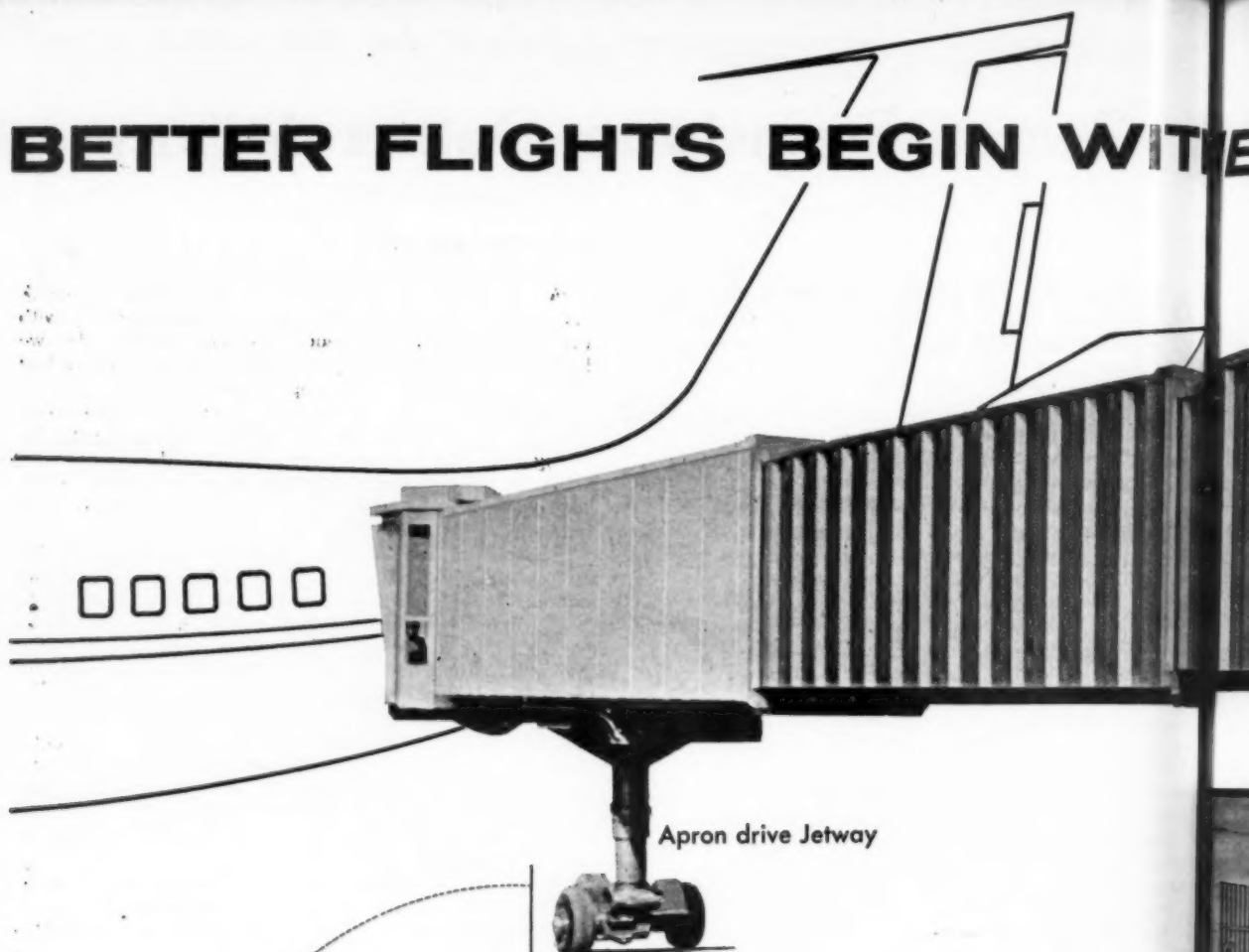


Delta's Jetway weighs 12,000 lbs., can be extended to "meet" aircraft. In foreground, Carvel Moore, Pacific Iron & Steel, right, with N. L. Fugate, Delta.

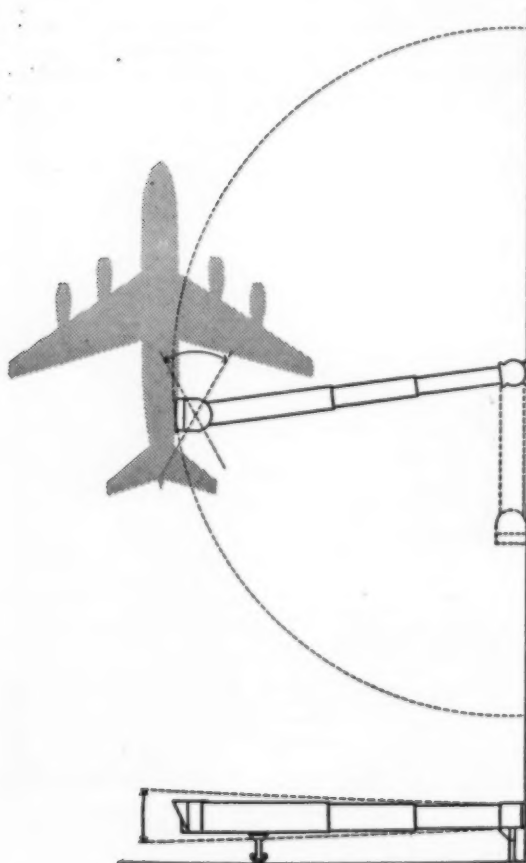


Inside the Jetway. Operator can control movement of ramp outward to airplane, then up or down to match floor levels. Ceiling height is 12 ft.

BETTER FLIGHTS BEGIN WITH



Apron drive Jetway



Jetway's comfort-corridor directly connects terminal and aircraft, protecting enplaning or deplaning passengers from noise and weather. With no stairs to climb, no diversions, no bottlenecks, Jetway saves precious loading time, providing ground-level convenience to complement modern jetliner luxury.

Self-powered, the Apron Jetway swings 180 degrees on positive-traction wheels, raises or lowers electro-mechanically, and extends as much as 107 feet.*

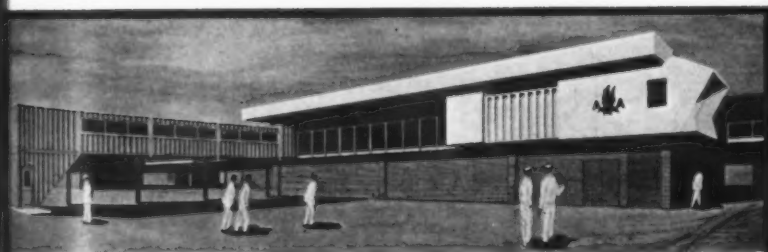
The outboard cab section swivels 30 degrees to either side and is equipped with special weatherseal curtains assuring a snug fit to any fuselage. Electrical sensors maintain perfect floor alignment.

One man at the Jetway cab console controls all movement and can position the unit at the aircraft door before passengers are ready to leave their seats.

The Jetway accommodates any airliner—prop-driven or jet.

**Present Jetway Apron models measure 44 or 52 feet, retract and extend 90 to 107 feet. Flexible telescopic design and flexible steel, rigid-span construction permit units to be custom built to the carrier's particular requirements.*

JETWAY



NOSE-LOADING ELEVATED WALKWAY

The second story, nose-loading Jetway saves time and simplifies positioning problems by moving out on overhead rails to meet the aircraft. Vertical action adjusts for plane level. Exclusive fluted-steel construction, full insulation, electrical sensor alignment and weatherseal fuselage-fitting curtains assure first-class passenger satisfaction.

Jetways are now being supplied to leading airline companies for use at major air terminals.

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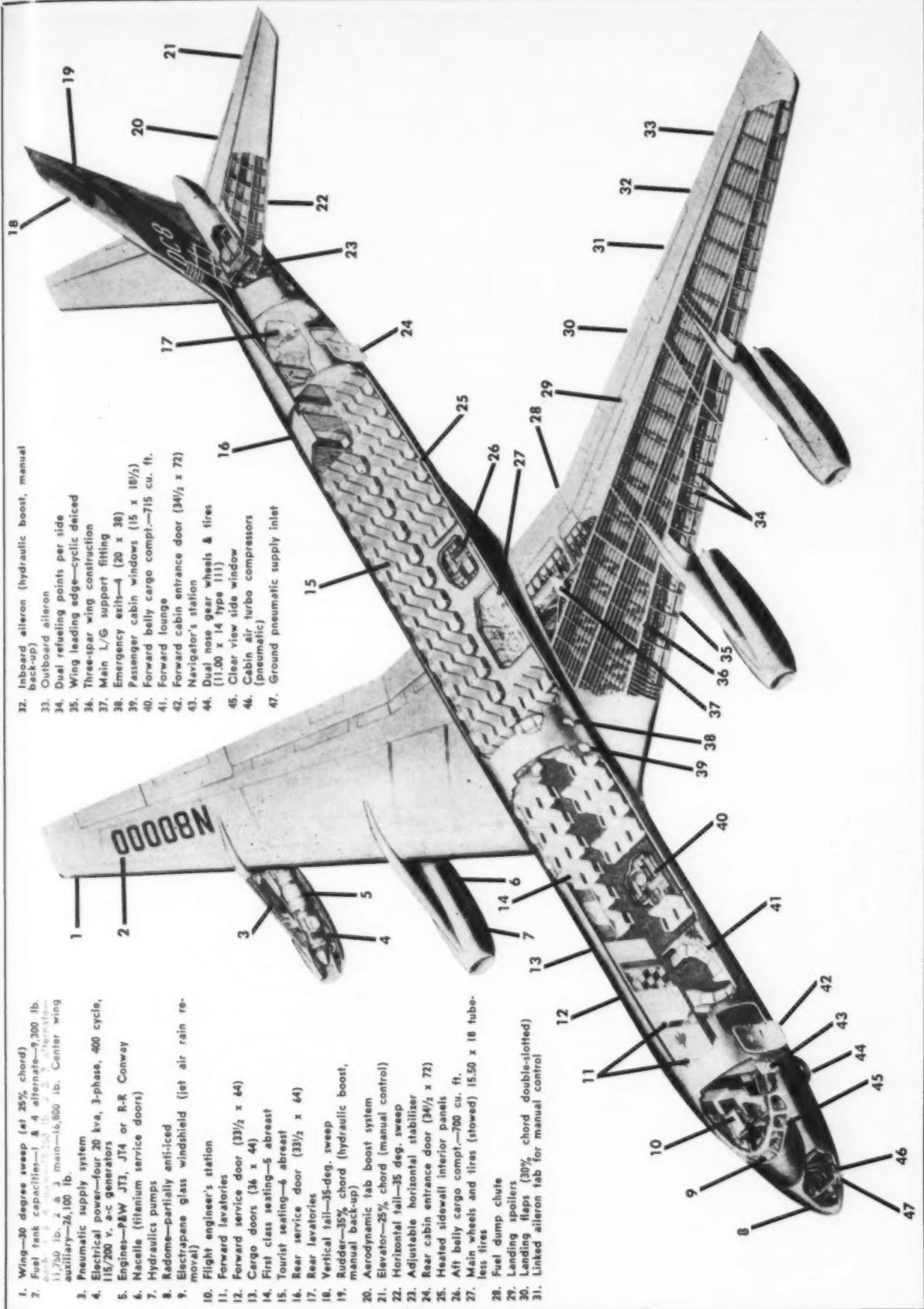
CL-44's have also been ordered for the Royal Canadian Air Force.

The Tyne is an advanced twin-spool high compression prop-jet designed to give very low fuel consumption and is due to enter service in 1960 at ratings of 4,985, 5,545 and 5,730 e.h.p.

It also powers the Vickers Vanguards ordered by British European Airways and Trans-Canada Air Lines and has been specified for the Fairey Rotodyne and the Short Britannic 3's on order for the Royal Air Force.

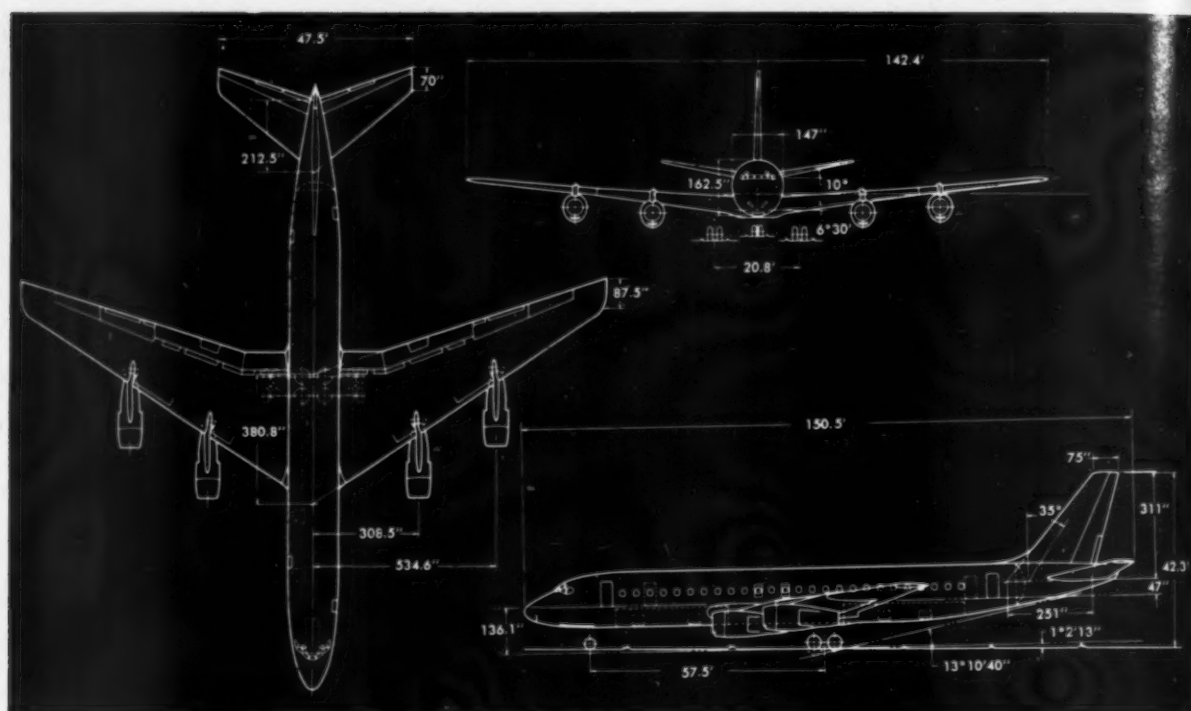
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9. Electrapane glass windshield (jet air rain removal)
10. Flight engineer's station
11. Forward lavatories
12. Forward service door (33 1/2 x 64)
13. Cargo doors (36 x 44)
14. First class seating—5 abreast
15. Tourist seating—6 abreast
16. Rear service door (33 1/2 x 64)
17. Rear lavatories
18. Vertical tail—35-deg. sweep
19. Rudder—35% chord (hydraulic boost, manual back-up)
20. Aerodynamic tab boost system
21. Elevator—25% chord (manual control)
22. Horizontal tail—35 deg. sweep
23. Adjustable horizontal stabilizer
24. Rear cabin entrance door (34 1/2 x 72)
25. Heated sidewall interior panels
26. Aft belly cargo compartment—700 cu. ft.
27. Main wheels and tires (stowed) 15.50 x 18 tubeless tires
28. Fuel dump chute
29. Landing spoilers
30. Landing flaps (30% chord double-slotted)
31. Linked aileron tab for manual control

32. Inboard aileron (hydraulic boost, manual back-up)
33. Outboard aileron
34. Dual refueling points per side
35. Wing leading edge—cyclic deiced
36. Three-spar wing construction
37. Main L/G support fitting
38. Emergency exits—4 (20 x 36)
39. Passenger cabin windows (15 x 18 1/2)
40. Forward belly cargo compartment—715 cu. ft.
41. Forward lounge
42. Forward cabin entrance door (34 1/2 x 72)
43. Navigator's station
44. Dual nose gear wheels & tires (11.00 x 14 type 111)
45. Clear view side window
46. Cabin air turbo compressors (pneumatic)
47. Ground pneumatic supply inlet



Complete Specifications on DC-8

DC-8 Dimensions (all models)

Over-all height—42 feet 4 inches
 Over-all length—150 ft. 6 in.
 Wing span—142 ft. 5 in.
 Wing area—2770.6 sq. ft.
 Wing sweepback at 25 per cent chord—30 degrees
 Vertical tail area—351 sq. ft.
 Vertical tail sweepback at 25 per cent chord—35 degrees
 Horizontal tail span—570 in.
 Horizontal tail area—559 sq. ft.
 Horizontal tail sweepback at 25 per cent chord—35 degrees
 Tread—250 in.
 Wheel base—688 in.
 Width of runway required for 180 degree turn—87 ft. 10 in.
 Turning radius for wing tip clearance—91 ft. 1 in.
 Total usable cargo volume—1390 cubic feet

Nine Versions of the DC-8

Engine	Model	Weight	Fuel
JT3C-6	Domestic, medium range	265,000 lbs	114,400 lbs
JT4A-3	Domestic, medium range	265,000 lbs	114,400 lbs
	Intercontinental, medium-long range	287,500 lbs	140,500 lbs
	Intercontinental, extra-long range	310,000 lbs	142,528 lbs
JT4A-9	Intercontinental, extra-long range	310,000 lbs	151,500 lbs
Conway	Domestic, medium range	265,000 lbs	114,400 lbs

Intercontinental, medium-long range	287,500 lbs	140,500 lbs
Intercontinental, extra-long range	310,000 lbs	142,528 lbs
Intercontinental, extra-long range	310,000 lbs	151,500 lbs

DC-8 Performance with JT4A Engines

Block distance, naut. mi.	2,000	4,935	4,970
Payload, lbs.	35,680	16,196	26,500
Takeoff weight, lbs.	244,500	287,500	310,000
Takeoff field length (sea level), ft.	5,910	8,400	9,220
Landing weight, lbs.	183,800	162,930	175,900
Landing field length (sea level), ft.	6,400	5,640	6,090
Block speed, knots	459	459	457
Cruise speed, knots	494	478	478
Fuel burned, lbs.	60,700	124,570	134,100
Cruise altitude, ft.	30,000	Variable	
Average rate of climb to cruise altitude, ft./min.	1,980	1,390	1,245
All engine takeoff rate of climb at sea level, ft./min.	2,150	1,755	1,750
The above data are based on the assumptions listed below:			
Maximum takeoff weight, lbs.	287,500	287,500	310,000
Maximum landing weight, lbs.	194,000	194,000	199,500
Maximum zero fuel weight, lbs.	170,550	170,550	176,500
Operating weight empty, lbs.	130,804	130,804	132,234
Number of passengers (mixed first class and tourist)	132	132	132

Power for the DC-8

Jets Now, Turbofans Coming Up

THE PACE OF COMMERCIAL jet engine development since the first go-ahead on DC-8 production has been so fast that the engines powering the Douglas jet into airline service already are earmarked for retirement.

Pratt & Whitney's JT3C-6, used with water injection by both United and Delta Air Lines on September 18 to power DC-8 inaugurals, are destined to give way to the quieter, more powerful and waterless P&W JT3D fan.

United already has made a partial move in that direction and there's little question but that Delta, the only other user of water injection on DC-8s, eventually will follow suit. The rash of water injection problems harassing operators of the JT3 on the 707 should be encouragement enough to make the decision now.

In all, Pratt & Whitney came off with the lion's share of engines in the pods of DC-8s—93% to be exact. Beside the two JT3 operators, 15 airlines (including UAL) called for the bigger JT4s in their DC-8s and two (Trans-Canada and Alitalia) went for Rolls-Royce Conways.

But the scene is shifting rapidly. UAL will get four aircraft with JT3Ds and KLM, in a recent re-order, specified the fan engine instead of JT4s on five of its aircraft. Among the JT4A purchasers, all will get -3 engines except Pan American. It elected the -5, a \$15,000 more expensive model using titanium to shave engine weight some 205 lbs.

Here's how the DC-8 stable of P&W jets shapes up: JT3C-6—rated at 13,000 lbs. dry with water is in service. It is most prone to replacement for three reasons: (1) more power, (2) to delete water from airline operation, and (3) possibly to eliminate need for noise suppressors.

JT4A-3—rated at 15,800 lbs. dry won't see airline service until DC-8 certification in November. In various versions (see table) it will power the majority of the Douglas jets. JT4A-5—lighter weight version of -3 also rated at 15,800 lbs. ordered by Pan American.

JT3D-1—turbopan version of JT3 rated at 17,000 lbs. due for first availability in July 1960. Climb thrust rating is about 10,600 lbs. and cruise 4,000 lbs. with cruise specific fuel consumption about 0.78 lb./hr./lb.

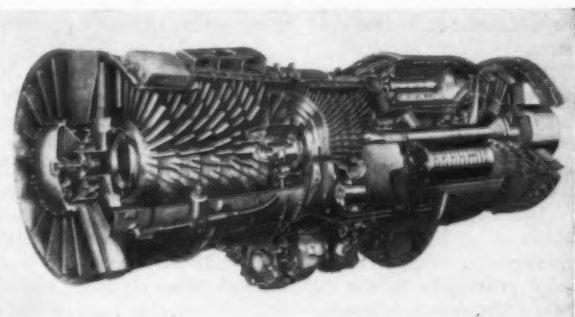
With this stable of turbine powerplants, P&W has the biggest stake in its history in commercial air transport and it is overlooking no opportunity to insure that its investment is well protected.

The only major problem that has shown up in this operation to date, a 3rd stage turbine blade failure, touched off a project exemplifying P&W's determination to keep its engine record clean. At 3 p.m. last New Year's Eve, service managers Bert McNamara and F. H. "Tiny" Flynn made the decision that all 3rd stage turbine blades had to be replaced before they passed 300 hrs.

By the next morning (New Year's Day), six P&W field engineers from as far south and west as Virginia and Kansas City were transplanted and on hand to join three already at Idlewild Airport with parts to handle the job. In two months, the entire fleet changeover was made.

The only engine "bug" that showed up and was promptly fixed almost brought dire results. On takeoff from Paris, two engines flamed out when the pilot applied heat, one on each side. One responded immediately to restart, the other

took about two minutes. Investigation showed that seal leakage in the inlet area permitted water to become trapped, then drawn into the engine upon application of heat. As a precaution, operators now keep igniters energized for five minutes after takeoff, also turn on ignition if icing is anticipated.



Vital Statistics on the JT4

Most DC-8s will be powered by P&W's JT4 engine, a derivative of the military J75. Here are the various specifications of models being developed by P&W:

Designation		JT4A-3,-5JT4A-9,-10JT4A-11,-12		
Production Delivery	.....	In Process	Jan. 1960	July 1960
Engine Dry Weight	....	5,020(-3) 4,815(-5)	5,050(-9) 4,845(-10)	5,100(-11) 4,895(-12)
Water System Weight	..	None	None	50
Total Weight	....	5,020(-3) 4,815(-5)	5,050(-9) 4,845(-10)	5,150(-11) 4,945(-12)
Thrust Ratings				
Takeoff Static				
S.L. Std.	..... Wet	.....	.....	17,500/.84
	..... Dry	15,800/.78	16,800/.81	17,500/.84
S.L. 90°F	..... Wet	.....	.....	17,500
	..... Dry	14,430	15,450	16,120
5,000' 80°F	..... Wet	.....	.....	14,550 (Est)
	..... Dry	12,400	13,200	13,780
Max. Continuous				
S.L. Static	.....	12,500	13,500	14,900
5000' 275 Kts.	.....	10,100	.....	.....
Normal Rated				
S.L. Static	.....	12,500	13,000	14,900
Cruise /TSFC				
S.L. Static	.....	11,450/.74	11,850/.74	13,800/.75
25,000' 475 Kts.	.....	5,750/.915	5,900/.92	6,650/.94
30,000' 475 Kts.	.....	5,030/.905	5,130/.905	5,750/.935
35,000' 475 Kts.	.....	4,250/.885	4,470/.895	4,950/.935
35,000' 475 Kts.	.....	3,700/.91	.....	.....
Dimensions				
Max. Diameter	.....	43 in.	43 in.	43 in.
Max. Length	.....	144.1 in.	144.1 in.	144.1 in.

Conway Thrust Gets Early Boost

THE FIRST DC-8 powered by the Rolls-Royce Conway by-pass engine will enter service with Trans-Canada Air Lines early next year. Alitalia, the other Conway buyer, receives its first airplane in the fall of 1960. Originally the Conway was due to enter airline service at the R.Co.10 rating of 16,500 lbs. guaranteed minimum thrust and then be uprated to the R.Co.12 rating some 12 to 18 months later.

However, the very satisfactory progress of Conway development has made it possible to start airline service at the higher rating of 17,500 lbs. Rolls-Royce emphasizes that this rating is a minimum and, in accordance with the British engine manufacturer's usual practice, the Conway R.Co.12 will be operating at thrusts of about 18,000 lbs. in service.

The Conway is an engine of relatively low by-pass ratio (ratio of air passing through the by-pass duct to that going through the combustion chambers). The by-pass ratio was fixed principally by the maximum installed diameter and is below the optimum now considered desirable for commercial transport use.

Nevertheless it gives substantial advantages over the straight jet in this application: the cruising specific fuel consumption of the R.Co.12 (35,000 ft. 475 kt. ISA conditions) is 0.905 lbs./hr./lbs. thrust, for a basic dry engine weight of 4,506 lbs. This, incidentally, is the contract weight figure, and engines already delivered have been appreciably lighter.

Conway testing has been aimed throughout at reproducing the conditions met in civil operation, particularly in obtaining high running hours on individual engines in preference to a high total of hours spread over a large number of engines. In all, 27,000 hours of running had been logged by August 1959 including 3,700 flight hours. When the engine enters service more than 14,000 hours will have been run at thrusts over 16,500 lbs., some in excess of 20,000 lbs.

2,500 hrs. for components

Several 1,000 hour endurance tests have been run, and 2,500 engine flying hours were logged in the first Avro Vulcan flying testbed up to September 1958, when the aircraft was destroyed following a structural failure of the airframe.

Since July 1959 a second Vulcan flying testbed has been in service. Following intensive flying, the program is not far behind that projected before the loss of the first aircraft. Engines have already been inspected after 600 hours flying. Before airline service begins engines will have been checked after 1,000 flying hours, with major component lives over 2,500 hours.

This testing makes it possible to anticipate an introductory overhaul life of at least 600 hours. The Conway is engineered after normal Rolls-Royce practice as far as overhaul life is concerned: no scheduled unit changes or internal inspections are needed during the life of the engine, considerably reducing the time and cost of line maintenance.

Conway developments are all in the direction of higher power and lower specific fuel consumption. The R.Co.15 rating is a natural development of the R.Co.12, and production engines can be available at the end of next year. This engine is rated at 18,500 lbs. guaranteed minimum thrust and has a 4% improvement in fuel consumption.

R.Co.12 engines will be convertible to R.Co.15 rating at overhaul by the incorporation of modified 1st and 2nd low pressure compressor stages. This produces greater mass flow through the engine, giving higher takeoff thrust and improved cruise performance.

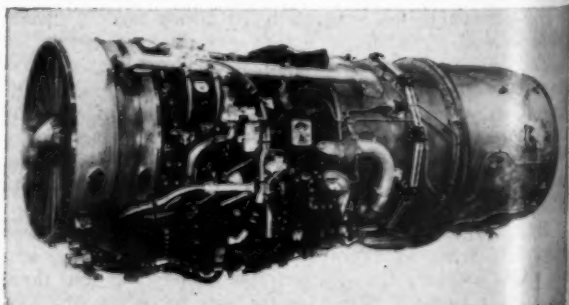
The Civil Conway is being developed to powers in excess of 20,000 lbs. thrust. These later engines will have a higher by-pass ratio nearer the optimum for long range transport use while still using the maximum number of existing Conway parts.

The best by-pass ratios

The choice of by-pass ratio follows detailed studies by Rolls-Royce. These show that the optimum ratio for transport aircraft lies in the region 0.6 to 1.0, when overall aircraft operating economics, as opposed to bare engine performance, are considered. Above a by-pass ratio of 1.0 a better engine specific fuel consumption is obtained, although the higher weight and drag of the necessarily larger engine lead to inferior aircraft economics.

In the later Conway the low pressure compressor will be of advanced design and greater capacity thus increasing still more the mass flow through the engine. The specific fuel consumption will be improved by well over 6% for cruise. Production for these Conways is scheduled for the end of 1961.

R.Co.12 and R.Co.15 engines can be converted at overhaul though the modification will be more extensive than that required to convert the R.Co.12 to the R.Co.15 rating. The most critical parts of the engine—the high pressure compressor and combustion equipment—will be substantially unchanged.



Rolls-Royce Conway by-pass (above), which will power DC-8s of Trans-Canada and Alitalia, holds the distinction of being the first non-U.S. engine to power a modern U.S. air transport. It will see first service early next year with TCA, later in 1960 with the Italian flag airline.

TCA orders Collins Automatic Pilot/Flight Director for new Vanguards

Trans-Canada Air Lines high density inter-city routes will soon be served by the new turbo-prop Vickers Vanguards as part of TCA's growth toward the first all-turbine intercontinental fleet. TCA selected the world's most advanced performance automatic flight control systems for the high performance Vanguard - Collins AP-103 Automatic Pilot and FD-105 Integrated Flight System.

Smooth three-axis control of attitude and navigational situations, from take-off to touch-down, are effected in this minimum weight, transient free

system, preserving the motion-free comfort the Vanguard will provide for its 96 passengers.

Other Collins "Airline Standard" systems for the TCA Vanguard include VHF communication and navigation systems, glideslope receivers, ADF, and system antennas.

Collins flight control systems, now serving the TCA Viscount fleet, will provide flight director services on all-jet DC-8's soon to be added on TCA's trans-continental and trans-Atlantic flights.

Write Collins for literature on the AP-103/FD-105.



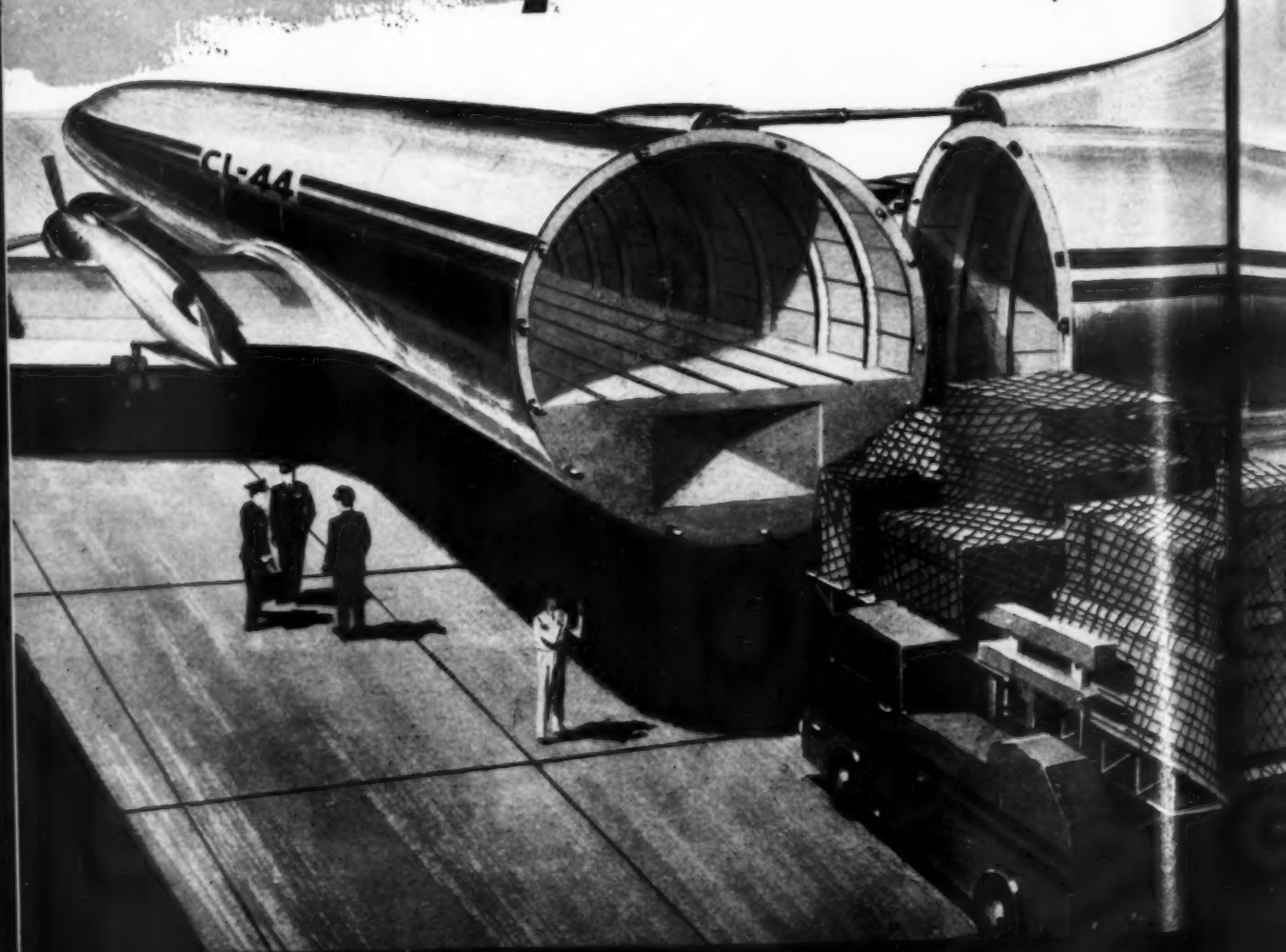
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The swing-tail Air Freighter that *revolutionizes* the air cargo industry





CANADAIR JET-PROP CL-44

...a truly capable all-cargo aircraft

The CL-44 is an uncompromised aircraft that has been designed specifically to meet the immediate requirements for an aircraft that will significantly lower the cost of air cargo movement. In terms of volume, payload, speed, range and costs it will provide an unparalleled service to business and industry that will trigger an unprecedented increase in air freight volume.

The characteristics of this long-range all-cargo aircraft are unique and differ importantly from the characteristics of an essentially passenger-configured or military-configured airplane that has been adapted to commercial cargo capabilities.

The CL-44 provides

A turbo-prop propulsion system, which in comparison with turbo-fan and turbo-jet, offers the most efficient combination of payload and speed for optimum economy.

Direct operating costs of less than 4¢ a ton mile, and a break-even load factor as low as 28%.

Mechanical loading facilities and swing-tail that reduce ground time, manpower and costs, and increase utilization.

In 1961, more than a year ahead of any other long-range turbine powered cargo aircraft, fleets of CL-44s will go into service with the world's largest air cargo carriers.

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all
in one
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PACAERO CONVERTS CONVAIRS TO ALLISON PROP-JETS AND COMPLETES THE MODERNIZATION



While your Convair 340 or 440 is undergoing conversion to the G.M. Allison prop-jet Super Convair at PacAero Engineering Corp., you can have the entire airplane *modernized within the same down-time*. Refurbish the interior. Have that major overhaul. Get radar installed. And much more. Only at PacAero is it possible to get this unusual service... and from Convair-conscious specialists.

PacAero is the exclusive source for converting Convairs to Allison 501-D13 prop-jets. This is a result of joint design and development planning between General Motors-Allison and PacAero with the direct cooperation of Convair.

Many important changes are included in the conversion, such as modifications of the nacelle, fuel system, heating, controls, empennage, and other elements. What better time to complete the modernization of your

Convair, especially when the modernizing will actually cost *less* when done at the same time as the engine conversion.

All PacAero materials and workmanship are warranted and certified. And PacAero engineers and technicians are acknowledged to be among the finest in the Aviation Industry. When you bring your Convair to PacAero for the Allison Conversion, consider the important advantages to having these done at the same time:

- Custom interior design, installation
- Radar installation
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Douglas DC-8 Systems Report

In the transition to jets and a bigness heretofore not faced in airline transports, the DC-8 systems anatomy has undergone some major changes. Electrical systems using a-c take over from d-c. Oxygen systems "pop out" automatically. Landing gears swivel, noise is suppressed and thrust is

reversed. On the following pages, AIRLIFT describes the many new facets of these inner organs of the Douglas jet transport, complete with notes about the manufacturers who contributed to them and schematic illustrations of the layout of their major components.

Electrical System: AC and DC

The primary DC-8 electrical power system is a 115/200-volt, 3-phase, 400-cycle, constant frequency, alternating current (a-c) system. The a-c power is supplied by four 20 kva engine-driven generators, one on each engine (30 kva generators have been installed for some operators). When engine speeds are between ground idle and takeoff, the Jack & Heintz generator speeds are held constant to 8,000 rpm (6,000 rpm for 30 kva generators) by Sundstrand generator-drive transmissions.

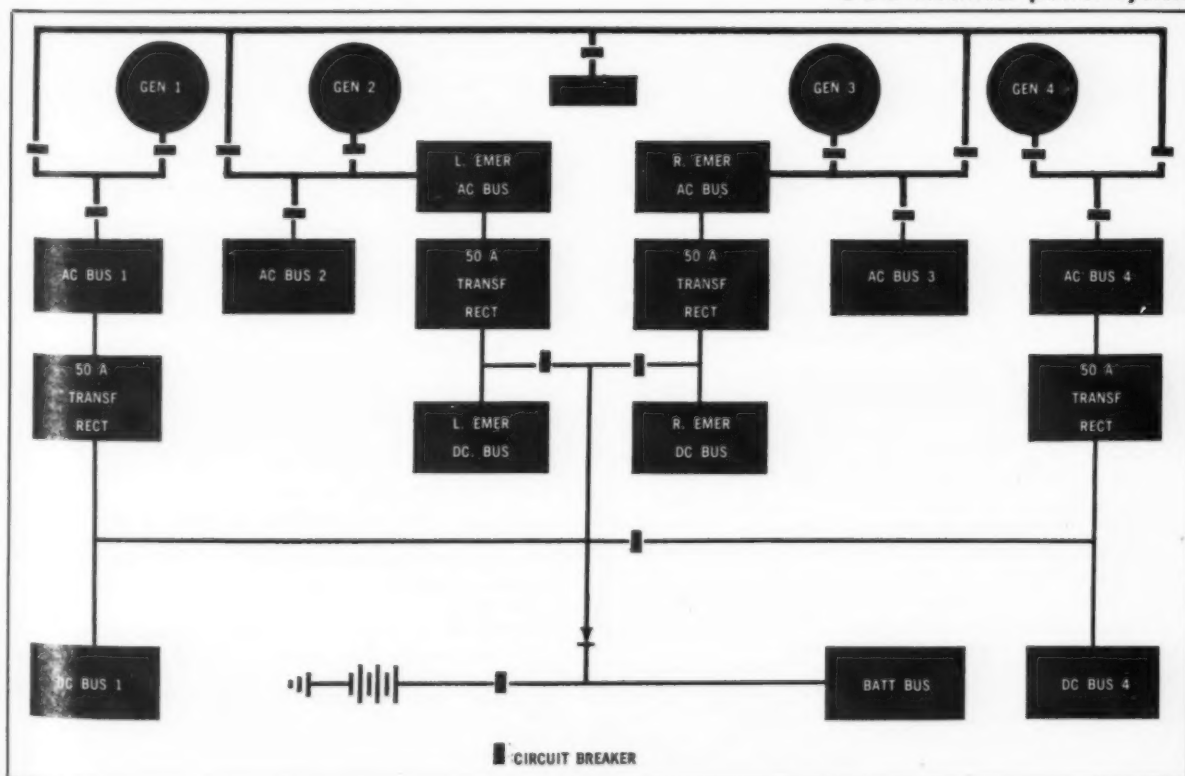
The four generator systems can be operated paralleled or unparalleled. Paralleled operation is preferred, since this allows the generators to share the total electrical load. This is done by the use of bus tie relays and an a-c tie bus. During unparalleled operation, each generator supplies its corresponding bus. The a-c distribution system has a bus for

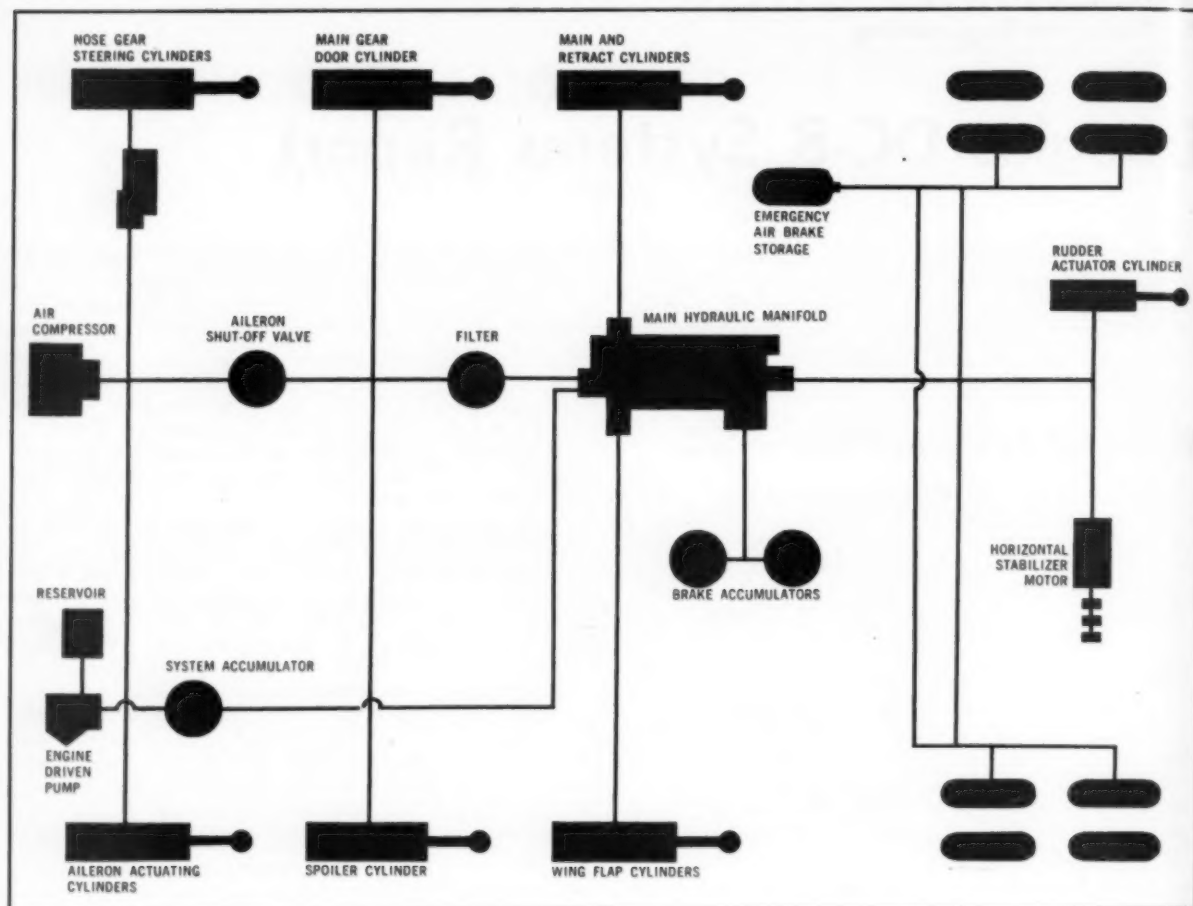
each generator and a left and a right emergency bus. The left a-c emergency bus is connected to generator bus No. 2, and the right a-c emergency bus is connected to generator bus No. 3. The emergency buses can be supplied power from any of the generators.

During normal operation of the generator system, an automatic circuit prevents any generator bus and the a-c tie bus from being without power when external power is connected to the a-c tie bus, or any number of generators are supplying power to the buses. During unparalleled operation, a preferential circuit controls the order in which the generators connect to the a-c tie bus and to the load of a failed generator. The preferential order is 2-3-1-4.

Four 50-ampere General Electric transformer-rectifier units installed in the aft portion of the aft air conditioning compartment, supply 28-volt, d-c power. Transformer-rectifiers Nos. 1 and 4 are connected to their respective generator buses. Transformer-rectifiers Nos. 2 and 3 are connected to their respective a-c emergency buses.

DC-8 electrical power system





Hydraulics: Three Systems

The hydraulic system is a 3,000 psi type consisting of an interconnected group of subsystems. Monsanto fire-resistant Skydrol type 500A is used. Three pressure systems are included in the hydraulic system: normal and auxiliary systems, and a separate system for actuation of the flight spoilers.

Hydraulic power for the normal system is supplied by two Vickers variable displacement pumps, one installed on each of the inboard engines. Hydraulic pressure for the

How the DC-8 Uses Hydraulics

In addition to their historic landing gear and brake missions, aircraft hydraulics have expanded their role in the new family of jets. Here's how the DC-8 uses hydraulics:

- Landing gear operation
- Main landing gear inboard door operation
- Wheel brake operation
- Nose wheel steering
- Wing flap extension and retraction
- Wing slot door operation (on airplanes so equipped)
- Aileron power (manual stand-by)
- Rudder power (manual stand-by)
- Horizontal stabilizer adjustment
- Noise suppressor extension and retraction
- Air supply compressor, for engine starting
- Emergency flap extension
- Emergency main gear down lock actuation

auxiliary system is supplied by a variable displacement, electrically-driven pump (N.Y. Air Brake Co.) in the left wing root.

The hydraulic system reservoir has a capacity of 10.5 gallons and is located in the left wing root area; it contains a reserve of fluid available only to the auxiliary pump. Accumulators with adjacent, direct reading pressure gages are provided for the main hydraulic system (located in the left wheel well), for the brakes (right wheel well), and for nose wheel steering (left aft side of nose wheel well).

The flight spoiler system, with its own hydraulic reservoir and Bendix pressure accumulator, obtains hydraulic pressure from a variable-displacement, electrically-driven pump located in the right wheel well.

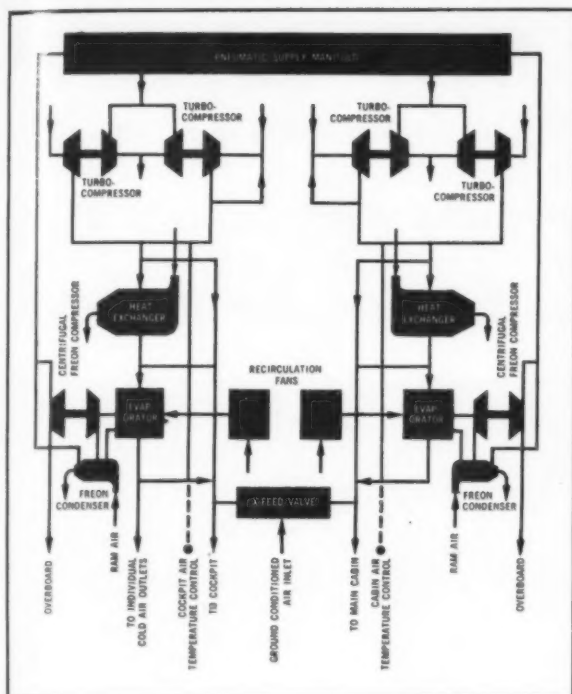
In the DC-8, for the first time, Douglas has turned to hydraulic boost for ailerons and rudder control in a commercial transport. The system is designed so that control automatically reverts to manual in event of hydraulic failure.

The DC-8 landing gear is made up of hydraulic actuators developed by Douglas, shock struts by Cleveland Pneumatic Tool Co., wheels and brakes by Bendix Products Division, Bendix Aviation Corp.

At the DC-8's 265,000 lb. takeoff gross, the weight per wheel for the main gear averages 31,000 lbs. and for each of the two nose wheels, 8,500 lbs. Pressures for the 44 x 16 (Type VII) main tires will vary from 148 psi for a 265,000 lb. DC-8 up to 168 psi for a DC-8 grossing 310,000.

Corresponding inflation pressures for the 34 x 11 (Type VII) nose tires will be 125 psi and 155 psi.

DC-8 air conditioning and pneumatic system



Air Conditioning: Two Systems

The DC-8 air conditioning system serves the dual purpose of providing cabin pressurization and air temperature conditioning. The cabin can be pressurized to maintain a full cabin pressure differential of 8.77 psi. This will provide a cabin altitude of 6,700 ft. when the airplane is flying at 40,000 ft., and a sea level cabin altitude up to 23,000 ft. Cabin temperatures can be maintained at a comfortable 70 to 75°F throughout an ambient temperature range of -100 to +100°F.

Two identical but completely independent systems are installed. Each includes two cabin air compressors, an air-to-air heat exchanger, and a Carrier vapor-cycle refrigeration system.

The compressors are Douglas produced. Air-to-air heat exchangers on the first 29 DC-8s were provided by AiResearch, and on subsequent models by Stewart-Warner.

The cabin air compressors and the vapor-cycle systems

are pneumatically powered, using ducted air from the airplane's pneumatic system.

Fresh air for ventilation and pressurization is drawn through ram air scoops in the nose section of the airplane and ducted to the cabin air compressors. Because of this intake location, which is remote from the engines, the possibility of air contamination is eliminated.

The DC-8 is provided with an integrated pneumatic system which supplies power for cabin pressurization, refrigeration, ice protection, rain removal, and engine starting.

High energy air for the pneumatic system is obtained by bleeding air from the compressors of each of the four engines.

Air from the engines is distributed through manifolds that extend from the pylons, spanwise through the wing, and forward to the nose section; here the right and left manifolds are joined by a pneumatic crossfeed valve. Both systems are equipped with protective devices that warn of system leaks. The main pneumatic ducts in the fuselage pressurized area are shrouded and excessive leakage of the inner duct will activate the detection system in the shroud, illuminating a warning signal.

The pressure and temperature of the pneumatic system air are regulated to 38 ± 2 psig at $450 \pm 10^\circ\text{F}$.

Oxygen: Four 1,800 PSI Tanks

The DC-8 oxygen system is the airline "standard" high pressure type as opposed to the liquid oxygen systems adopted by the military services in their transition to jets.

In the DC-8, four 1,800 psi cylinders supplied by Zep Aero, Scott Aviation Corp. and Walter Kidde furnish the supply—three for the passenger system and one for the cockpit system. In addition, there are four passenger portable oxygen cylinders in the cabin and one crew portable system in the cockpit.

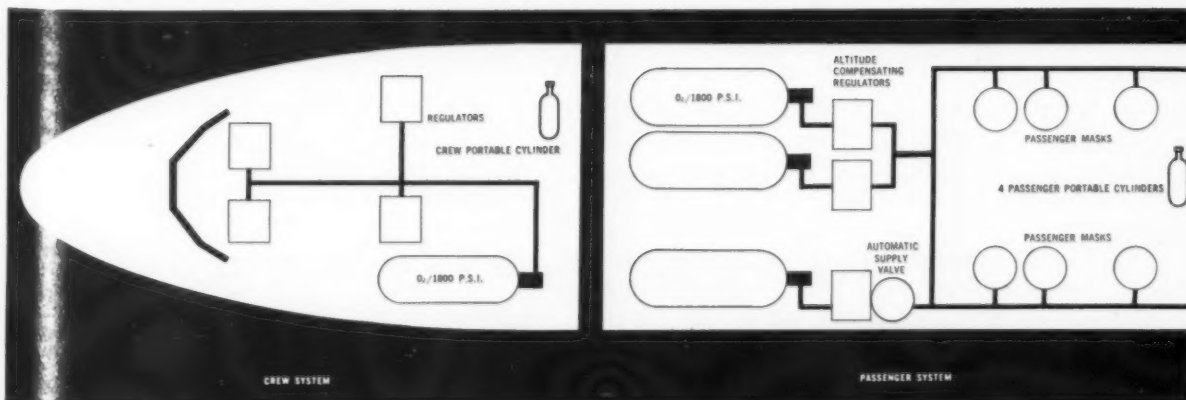
The most significant change in oxygen system designed for the commercial jets is the provision for automatic dispensing of masks to passengers in event of explosive decompression at altitudes above 15,000 ft.

In the DC-8, the oxygen equipment is located immediately in front of each passenger and is stored in the back of the cabin seat just above the built-in meal tray. In event of a decompression, the oxygen compartment door opens automatically and drops the mask within easy reach of passengers.

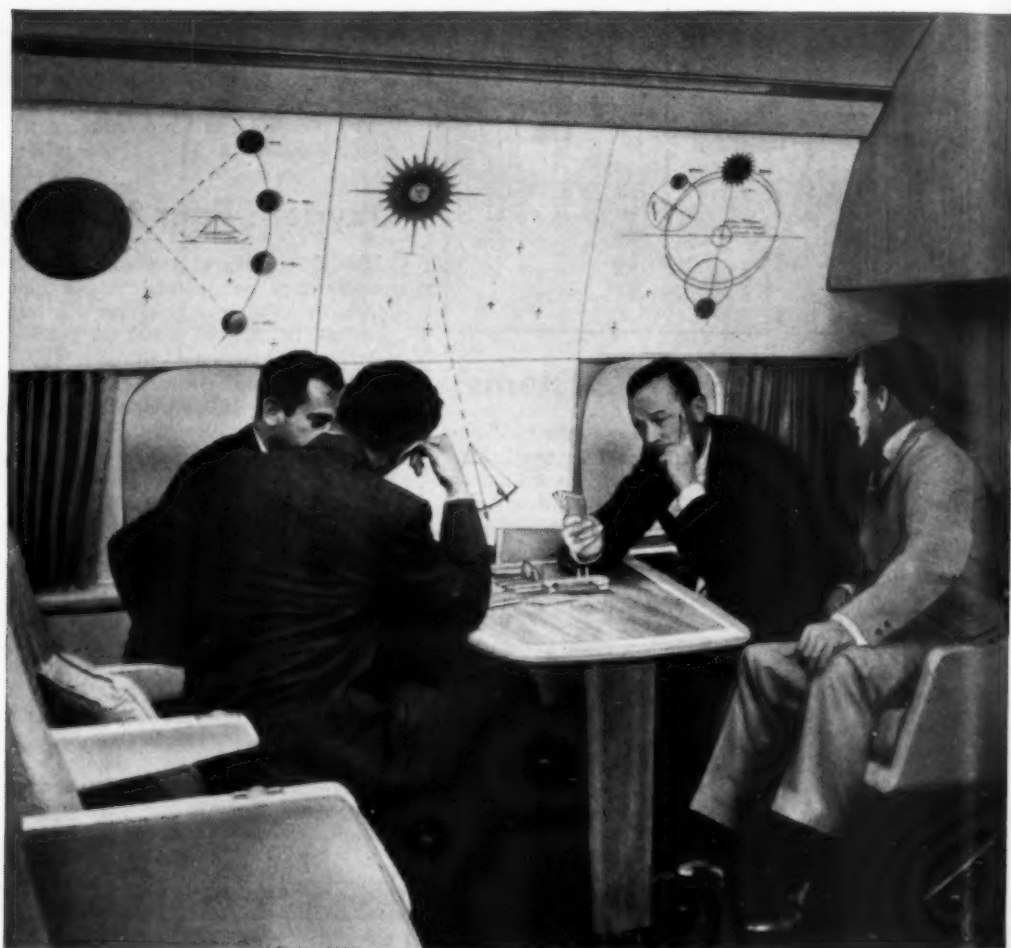
In operation, oxygen is fed from the supply cylinder through regulators supplied by Scott Aviation, Alar Products, Inc. and National Welding Equipment Co.

Oxygen outlets for the DC-8 were developed by Puritan Compressed Gas Co.

DC-8 oxygen system



UNITED AIR LINES BEST OF THE JETS



Biggest lounge in the sky is the Red Carpet room on the DC-8. Extends the full width of the plane. United limited the seating in the DC-8 so there could be two lounges (First Class and Coach) and wider, comfortably spaced seats. Decorations by Raymond Loewy.*

*Red Carpet is a service mark owned and used by United Air Lines, Inc.

CALIFORNIA - NEW

DC-8 JET SERVICE ACROSS THE U.S.A.



Best for quietness. United Air Lines specified extra soundproofing and special, sound-absorbing fabrics in the DC-8 to make it the quietest jet by far. Luxurious, too. Design concept of United's DC-8 Jet Mainliner is to make all areas seem like well-appointed rooms.



Best for privacy. Wider, higher-backed seats in the DC-8 provide privacy. Other new features include individual controls for air, light and stewardess call button, all built into the seats.

Now you can enjoy the newest, biggest, roomiest, quietest of all the jets coast-to-coast across the U.S. It's United Air Lines new DC-8 Jet Mainliner®.—*THE BEST OF THE JETS*. More than a new airplane, the DC-8 offers a standard of comfort and luxury unmatched in jet travel. Your choice of service: deluxe First Class or thrifty Custom Coach. Jet Mainliner service in New York and San Francisco. Soon—Chicago, Los Angeles.



JET MAINLINER, BY DOUGLAS



EXTRA CARE HAS MADE IT THE BEST OF THE JETS

NEW YORK NONSTOPS

Engine Air Melts Wing Ice

The DC-8 incorporates an ice protection system designed for capabilities that permit all-weather operation.

The wing and tail leading edge surfaces (including the wing leading edge slots, on airplanes so equipped) are thermally deiced. The engine inlets, oil cooler, engine bleed air heat exchanger scoops, wing vent scoops, radome, tail isolation band, and fuselage nose air conditioning scoops are thermally anti-iced.

Surfaces that are thermally anti-iced or deiced are heated by bleed air supplied by the engines at 450F and distributed through a system of pneumatic ducts and valves. The windshields, pilot tubes, and engine inlet pressure probes are electrically anti-iced.

The ice protection system is designed for ease of maintenance. The conventional double-skin arrangement, which discharges heated engine bleed air into the leading edge interiors and then overboard, requires no maintenance.

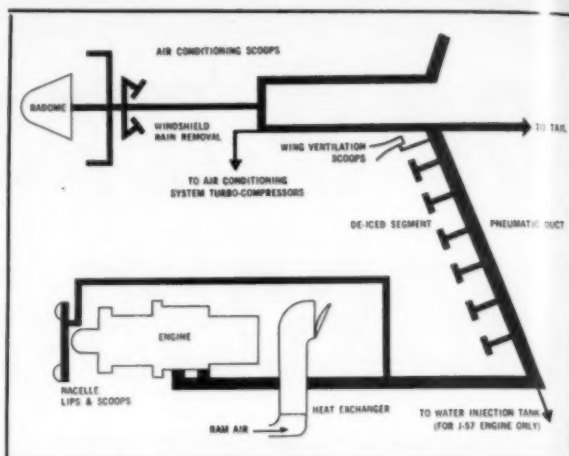
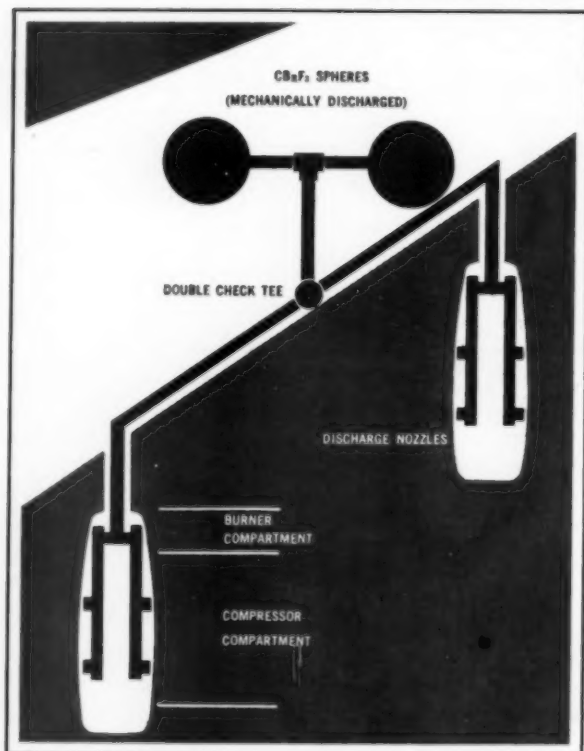
The anti-icing and deicing controls are located in the flight compartment. Two deicing program timers are installed on the systems operator's instrument panel; one is used as a stand-by in the event a timer malfunctions under icing conditions.

Excellent windshield rain removal is accomplished by Douglas developed air blast system, using air ducted from the pneumatic system. Use of hot air for windshield rain removal eliminates the inherent maintenance problems associated with mechanical systems.

Individual Fire Extinguishers

The fire protection system is divided into two subsystems, detection and extinguishing. Fire detection, by Thomas

Fire protection system



DC-8 ice and rain protection system

Edison, Inc., is provided for the engines and the cargo compartments. Kidde fire extinguishing is provided for the engines only since the cargo compartments are airtight and will contain any fires originating in them.

A continuous-element fire detector is installed in each nacelle. When a detector circuit is energized, the master fire warning light on the glare-shield and the master repeater fire warning light on the systems operator's control panel lights, a firebell rings, and a light in the corresponding fire shutoff level handle goes on to show the flight crew the affected engine.

Overheat detectors, made by Wallace and Black, are installed in each lower cargo compartment. When the detector circuit in either compartment is actuated, the corresponding overheat indicating light on the systems operator's control panel will go on.

Individual fire extinguishing systems, independent of one another, are installed in each wing. Each system consists of two agent containers and shutoff valve assemblies, a check valve tee to prevent discharge from one agent container into the other, a check valve tee for ground operational checks, a directional valve for selecting the engine to which the agent is to be directed.

DC-8 Autopilot Checks Itself

Automatic flight control of the DC-8 is accomplished by an electronic guidance and control system developed by Sperry Gyroscope Co. specifically for jet airliners.

It is built around Sperry's SP-30 flight control system which provides automatic control of pitch trim, constant altitude, coordinated turn, yaw damping, preselected heading, automatic approach and omnirange flying.

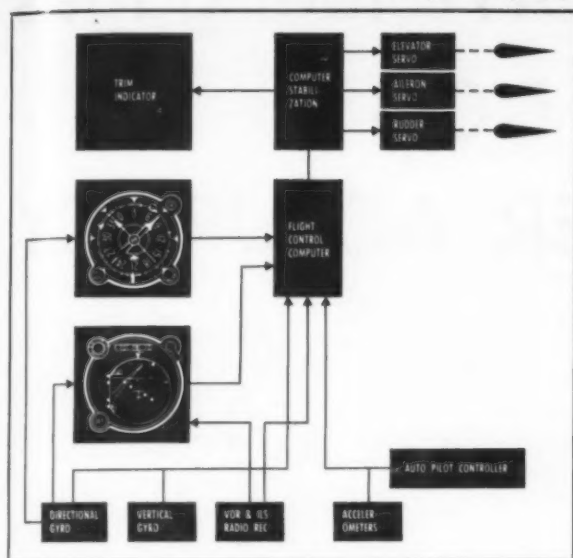
Control stems from an automatic pilot controller, which is a compact, edge lighted panel with all of the SP-30's engage and mode controls. Controls are distinctively shaped to permit rapid operation by "feel."

Switches are solenoid latching and have a safety interlock to prevent improper switch operation.

An automatic pilot indicator shows servo trim condition, radio coupler arming, automatic pitch status and automatic pilot disengagement. A "press-to-test" feature checks on its own operation.

The "brain" of the DC-8 flight control system is the flight control computer which collects data from the vertical gyro, linear accelerometer, automatic pilot controller and radio receivers and modifies them into working signals. It is a plug-in, modular designed unit consisting of three

DC-8 autopilot system



command computers, a pressure computer, a radio coupler and an interlock rack.

A stabilization computer containing five rack mounted modules power amplifies the modified signals from the flight control computer to drive the servos. It also monitors command and response intelligence passing through the system to determine if the automatic pilot is functioning properly.

Acceleration sensors and a velocity servo system provide positive control of rudder, elevator and aileron motion. An inertial path damping system provides tight altitude, cruise and radio guidance control.

A no-drift gyro insures pinpoint navigation over long distances.

The SP-30 system is all transistorized, has no vacuum tube circuits. Transistors and magnetic amplifiers reduce

space, while modular construction permits rapid replacement of components.

Indicators are edge lighted. Lights are red to preserve pilots' night vision.

'High Speed' Radio Antennas

The DC-8 incorporates communication and navigational equipment that meets or surpasses the ARINC (Aeronautical Radio, Inc.) characteristics developed for modern, high speed, commercial aircraft.

Most of the electronic components are contained in the radio rack located in the left hand aft section of the flight compartment. An electric blower cools the rack.

Facilities for the following systems have been provided:

Dual H.F. Com.	Dual Doppler Radar
Dual V.H.F. Com.	A.T.C. Transponder
Dual A.D.F. Navigation	Identification
Dual V.O.R. Navigation	Dual Selcal
Dual I.L.S. Navigation	Passenger Address
Loran	Flight Interphone
Marker Beacon	Service Interphone
Weather Radar	Passenger Entertainment

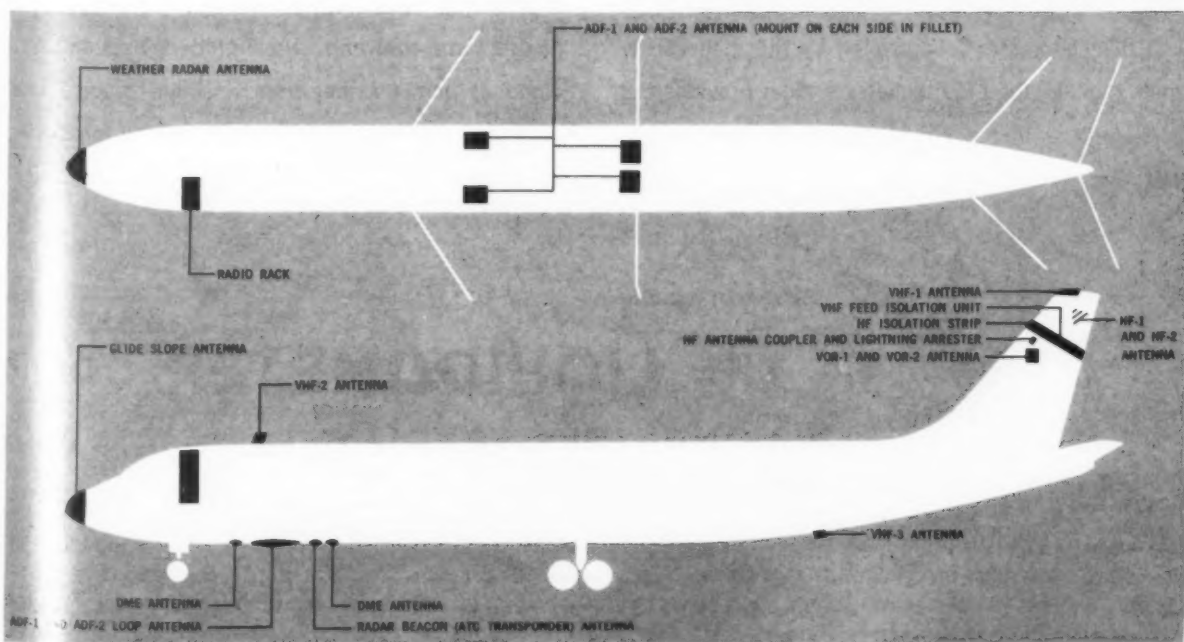
The speed of the DC-8 made the use of wire antennas impractical, and other antenna types that were common on airplanes with piston-type engines left much to be desired for use in the DC-8.

New antennas were designed. They are either flush or of low-drag design, their aerodynamic characteristics being as important as their electrical properties. The H.F. antenna, for example, utilizes the latest design concepts, being an integral, maintenance free, isolated portion of the vertical stabilizer.

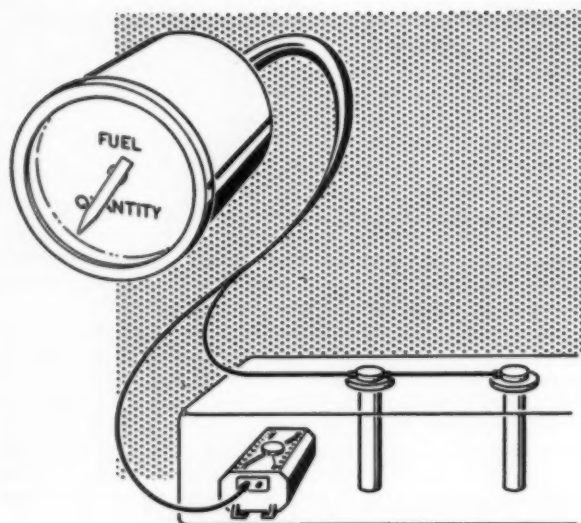
The H.F. antenna also incorporates a newly-designed lightning arrestor that is able to protect the system from damage by lightning, even during H.F. transmission.

A new low-loss, semi-rigid transmission line was developed to provide maximum performance from the new antennas. This transmission line is called "Foamflex." It has approximately one-half the transmission loss of lines formerly used, and is the same in weight.

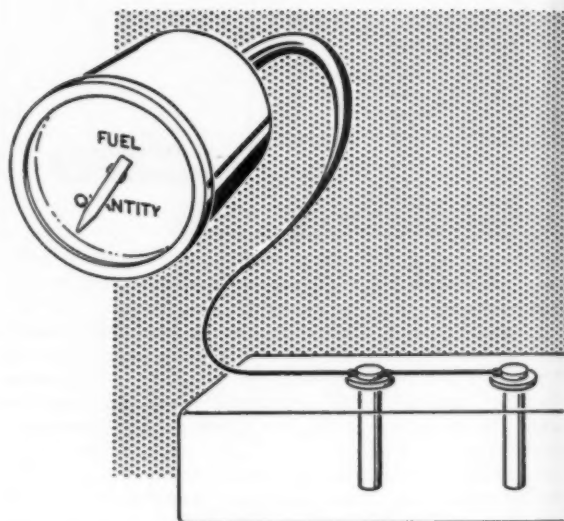
DC-8 communications and navigation system



Why TRUE WEIGHT fuel gages on the DC-8 provide GREATER ACCURACY



Liquidometer True Weight Gaging Systems sense the dielectric and density of aviation fuel as two independent variables. Volume is measured by tank units and a reference condenser, density by a LIQUIDensitometer*. Controlled by these measurement signals, the Liquidometer system provides the pilot with a direct indication of the *true weight* of fuel remaining.



Conventional gaging systems, on the other hand, depend upon the unpredictable relationship between the dielectric and the density of fuel. This relationship varies widely among different batches of the same fuel and, when plotted, appears as a cloud of points rather than a single precise line. Thus, conventional systems, incapable of measuring density directly, can only *approximate* the weight of fuel remaining.

Since 1920



...of proven quality

THE LIQUIDOMETER CORP.
LONG ISLAND CITY 1, NEW YORK

*trademark

Liquidometer True Weight Gaging Systems — service proven on thousands of military aircraft — are scheduled for first commercial service on UNITED AIR LINES DC-8 Jet Mainliners and later for ALITALIA • JAPAN AIR LINES • KLM-ROYAL DUTCH AIRLINES • SAS SCANDINAVIAN AIRLINES SYSTEM • SWISSAIR • TRANS-CANADA AIRLINES • UAT UNION AEROMARITIME DE TRANSPORT.



Sliding Ejector Cuts Jet Noise

Total investment by Douglas in the combination of suppressor and reverser for the DC-8 is \$21,000,000 to date.

In developing the suppressor alone, Douglas engineers constructed and tested some 500 physical variations at 10% scale, 350 variations at 20% scale and 50 types at full scale.

The one finally selected was a nozzle whose cross-section resembles an eight-petaled daisy. A further reduction in the sound level was achieved by adding a second portion called an ejector.

The cylinder-shaped ejector extends beyond the exhaust nozzle during takeoff. After takeoff it is retracted to become part of the engine pod. Douglas engineers learned that this device not only decreases the sound level but also increases takeoff thrust sufficiently to offset the loss caused by the nozzle.

DC-8 engine with ejector extended. Portion of eight-petaled daisy nozzle is visible through ejector.

The ejection portion of the sound suppressor incorporates a thrust brake to reduce landing roll or to decrease speed in flight. The brake consists of two contoured doors which can be closed after landing to turn the exhaust force forward. Except during braking, the doors lie flush with the sides of the ejector.

The reverse thrust achieved amounts to more than 40% of the forward thrust at maximum continuous power, giving the DC-8 an excellent rate of deceleration.

The thrust brake is pneumatically actuated but cannot operate until the ejector is fully extended.

Fuel: Up to 23,100 Gallons

There are three basic fuel tank arrangements on different models of the DC-8. Domestic versions have eight integral wing tanks with a capacity of approximately 18,000 gallons.

Intercontinental models have nine integral wing tanks (capacity about 21,720 gals.) and some versions have a tenth tank, consisting of seven interconnected bladder cells located in the wing-to-fuselage fillets.

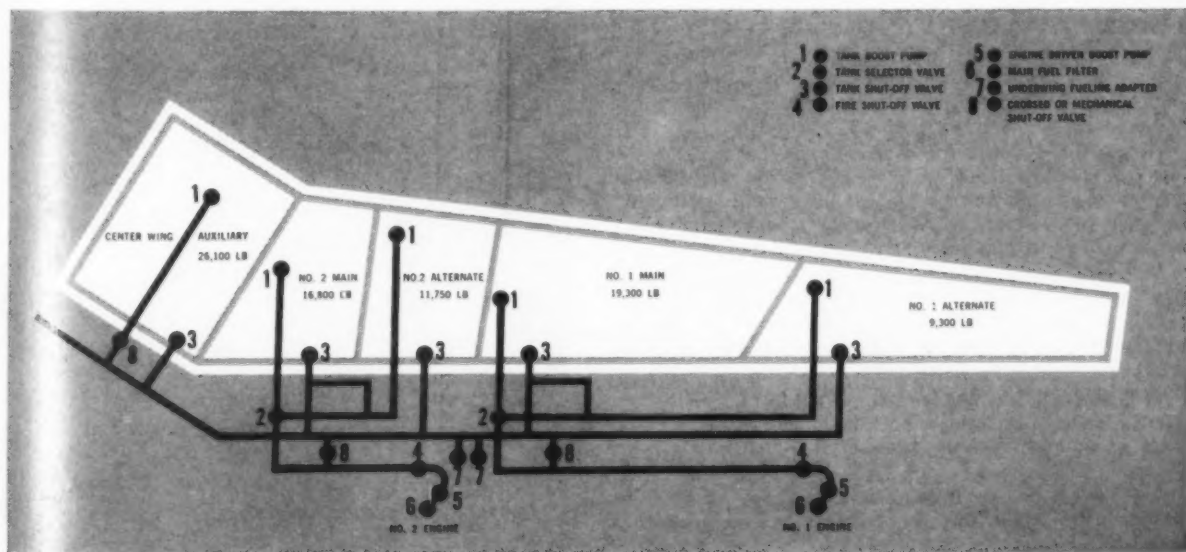
Fillet tanks hold 1,380 gallons, increasing the total fuel on the DC-8 to 23,100 gallons.

All systems function as a simple, four-tank system with engines supplied directly from main tanks for all normal operation. An uninterrupted supply of fuel is assured by the use of 125-gallon reservoir tanks, a-c electric reservoir feed pumps (made by Pesco) installed in each main fuel tank; and a Nash Engineering engine-driven boost pump installed on each engine.

Fuel in the main tanks, with automatic level control, is replenished with fuel transfer and crossfeed system. Pesco electric pumps are installed in main and alternate tanks for use as stand-by boost or fuel transfer, and in the auxiliaries for fuel transfer.

The DC-8 is fueled through four pressure filling points. Fuel-operated level control valves (Koehler) automatically shut the fuel off at maximum tank capacity. Partial fuel loads can be pre-set on fuel quantity indicators (Minneapolis-Honeywell or Liquidometer) that will close (General Controls) electric gate fill valves when the proper quantity is reached.

DC-8 fuel system



Million Huckbolt Fasteners Insure Leakproof DC-8 Tanks

More than a million Huckbolt fasteners in each DC-8 jet transport. This is the Douglas Aircraft Co.'s answer to leakproof integral wing fuel tanks on the big jets.

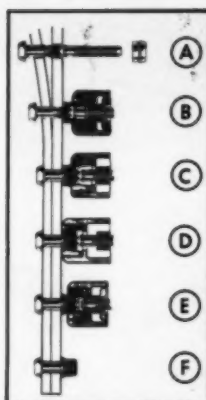
It's not a brand spanking new development. Douglas first introduced the approach on DC-6 types to erase the fuel leak problems experienced in earlier transports. But the wide-scale use of Huckbolts in the DC-8 employing special interference-fit installation techniques, leaves no doubt as to the Santa Monica planebuilder's thoughts on Huckbolt integrity and performance.

Here's the reason why. Instead of the usual nut, bolt and washer combination, the Huck Manufacturing Co. fastener consists of a grooved pin having a head and shank much like a bolt. Instead of a threaded nut, the Huckbolt uses a collar that is swaged onto the pin and locks into the pin grooves.

This means no loose bolts. Automatic tools install and swage the collars and a profile gage is all that's needed to verify proper installation.

The "interference fit" installation simply means the Huckbolt pin diameter is slightly larger than the hole in the structure it is fastening. A nominal 3/16 in. hole is finished with a No. 13 reamer to provide a 0.185 to 0.188-in. hole. Huckbolt shank diameter is controlled within 0.188 and 0.1895 in.

The result is a positive metal to metal seal against fuel



Huckbolt Installation (A to F, above): collar is swaged to pin, then tool snaps pintail. Right: photomicrograph of Huckbolt.

leakage. And Douglas engineers believe the interference fit will tend to improve fatigue strength rather than hinder it as early tests show a strength improvement as great as two-to-one in some structural areas.

As an additional bonus, the Huckbolt installation is lighter in weight than the equivalent nut, bolt and washer that otherwise would be used. And by providing the superior sealing characteristics, additional weight saving can be realized by confining fuel tank sealant application to the faying surfaces of structure. None is required on the Huckbolt head or collar.



Result of Huckbolt fastening is leakproof structure during dynamic fatigue testing of DC-8. Note extent of wing bending.

Titanium Saves Half a Ton

One of the more significant structural decisions made by Douglas in DC-8 development was a shift to greater use of titanium.

No less than one-half ton of titanium has been engineered into the big jet resulting in a weight saving equivalent to five passengers and their luggage. United values the saving as equal to one-half ton of cargo or a potential \$525 at mail rates for each transcontinental flight.

The area in which titanium is used is in the forward fuselage "rip stoppers" designed to prevent crack propagation and resulting explosive decompression. Second big titanium usage is in engine pods where Douglas estimates weight saving at more than 500 lbs.

A high strength alloy (Ti-6Al-4V) produced by Titanium Metals Corp. of American is used for the rip stoppers and TMCA commercially-pure titanium (Ti-75A) for the pods.

One of two key titanium items in DC-8 are the big hinged access panels on the jet pod. They are fabricated for Douglas by Ryan Aeronautical Co., San Diego.



AIRLIFT



HOW TO GET 160 MILLION AMERICANS OFF THE GROUND ...AT A PROFIT!

In order to win a larger share of the great American travel market, airlines must attract millions of *new* passengers. The basic market today is 10 million. But beyond this group lies the vast untapped potential of over 160 million Americans who have never flown!

If the promise of the jet age is to be realized, domestic air travel *must* grow at a far greater rate. Many leaders in the field are now urging promotional fares as the best—indeed the *only*—way to win over a significant part of America's non-flying population. The problem of offering promotional fares *at a profit* has beset the air transport industry since before the dawn of the jet age. How can it be solved?

There is one way and only one. Carriers must have

modern, turbine-powered equipment that offers competitive speed and comfort advantages plus two other very important features. They are: (1) *capacity* to absorb more passengers, and (2) *proven economy* which assures that reduced fares can be profitable.

It has been demonstrated again and again that the *jet-prop* offers the best combination of passenger appeal, routing flexibility and economical operation—on all ranges from 100 to over 1000 miles. And these are the ranges which include 75% of all American air travel!

On the following pages are two new aircraft that meet these vital jet age requirements for short and medium ranges—and to a degree unmatched by *any* other airliners.

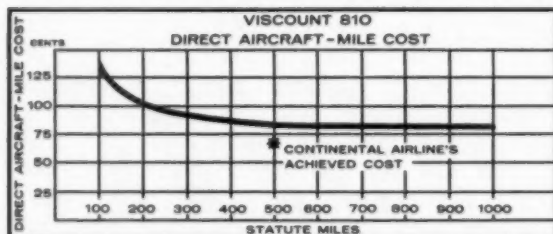


PLANE-MILE COSTS 15% BELOW ESTIMATES

70 passengers...15,000-lb. payload...365 mph...1200-mile range

Estimated costs showed that the Viscount 810 would be an amazingly economical aircraft. But actual operations proved it to be far more economical than expected!

After six months of service, Continental Airlines reported a plane-mile cost of only 71.33 cents—11 cents or 15% below estimates—for an average 500-mile sector. In fact, the new Viscount 810 proved so economical that Continental showed a \$1.3 million net profit in just seven months with an average fleet of only nine aircraft!



ISA, 10 MPH HEADWIND, FULL FUEL ALLOWANCE FOR GROUND MANEUVERING PLUS 2 HOURS RESERVE

HIGHER PROFIT MARGINS FOR PROMOTIONAL FLEXIBILITY

With seat-mile costs as low as 1.48 cents at 200 miles and 1.34 cents at 300 miles, the Viscount 810 opens the door for airlines to initiate promotional fares—and other traffic-stimulating plans. Promotional fares are being widely acclaimed as the surest method of broadening the base of the American air travel market. Today, that market is only 10 million. But there are 160 million more Americans waiting to be won over. In its size and class, the Viscount 810 offers a matchless combination of passenger appeal, routing flexibility and economy that can be used most effectively to attract substantial new traffic.

WORLD'S ONLY 2ND GENERATION JET AGE AIRLINERS!

The Viscount 810 and Vanguard benefit from the more than 2 million hours of worldwide in-the-air experience of over 400 Viscounts. And there is no substitute for experience!

FROM THE WORLD LEADER IN JET-PROP AIRCRAFT...VICKERS

VISCOUNT

810
840

POWERED BY FOUR ROLLS-ROYCE DART ENGINES

VICKERS-ARMSTRONGS (AIRCRAFT) LTD. • WEYBRIDGE, ENGLAND • MEMBER COMPANY OF THE VICKERS GROUP



SEAT-MILE COSTS UNDER 1¢




The base of the American air travel market must be broadened. The giant Vanguard, now proving its mettle in the skies over England, is the jet age airliner best able to do it *profitably*. No other aircraft—pure jet or jet-prop—approaches Vanguard's combination of high capacity and low operating costs. Seat-mile costs can be under 1¢ on all ranges from 1000 to 2000 miles—and only 1.4 cents at 200 miles.

LARGE, BALANCED PAYLOAD CAPACITY . . . In addition to a comfortable capacity of 139 seats, Vanguard offers 1360 cubic feet of cargo space below decks. With baggage for 97 passengers, plus 400 lbs. of mail, there is still 906 cubic feet available for freight. Here is capacity that is profitable today—and will be even more profitable tomorrow as load factors grow.

EXCEPTIONAL ROUTING FLEXIBILITY . . . At all altitudes from 5000 to 25,000 feet, Vanguard cost differential is amazingly slight. For example, a 500-mile sector flown at 10,000 feet costs only \$44. more than at 20,000 feet

139 passengers... 29,000-lb. payload... 425 mph... 2300-mile range

(optimum). A speed of over 400 mph is assured at altitudes from 5000 to 30,000 feet. In addition, ATC patterns will present no problems—physical or financial—for Vanguard operators! And the Vanguard has demonstrated that it can meet—or even beat—jet schedules on routes up to 1000 miles.

TRIP COST \$871—ALTITUDE 10,000 FT.	
TRIP COST \$840—ALTITUDE 15,000 FT.	
TRIP COST \$827—ALTITUDE 20,000 FT.	
500 MILES	

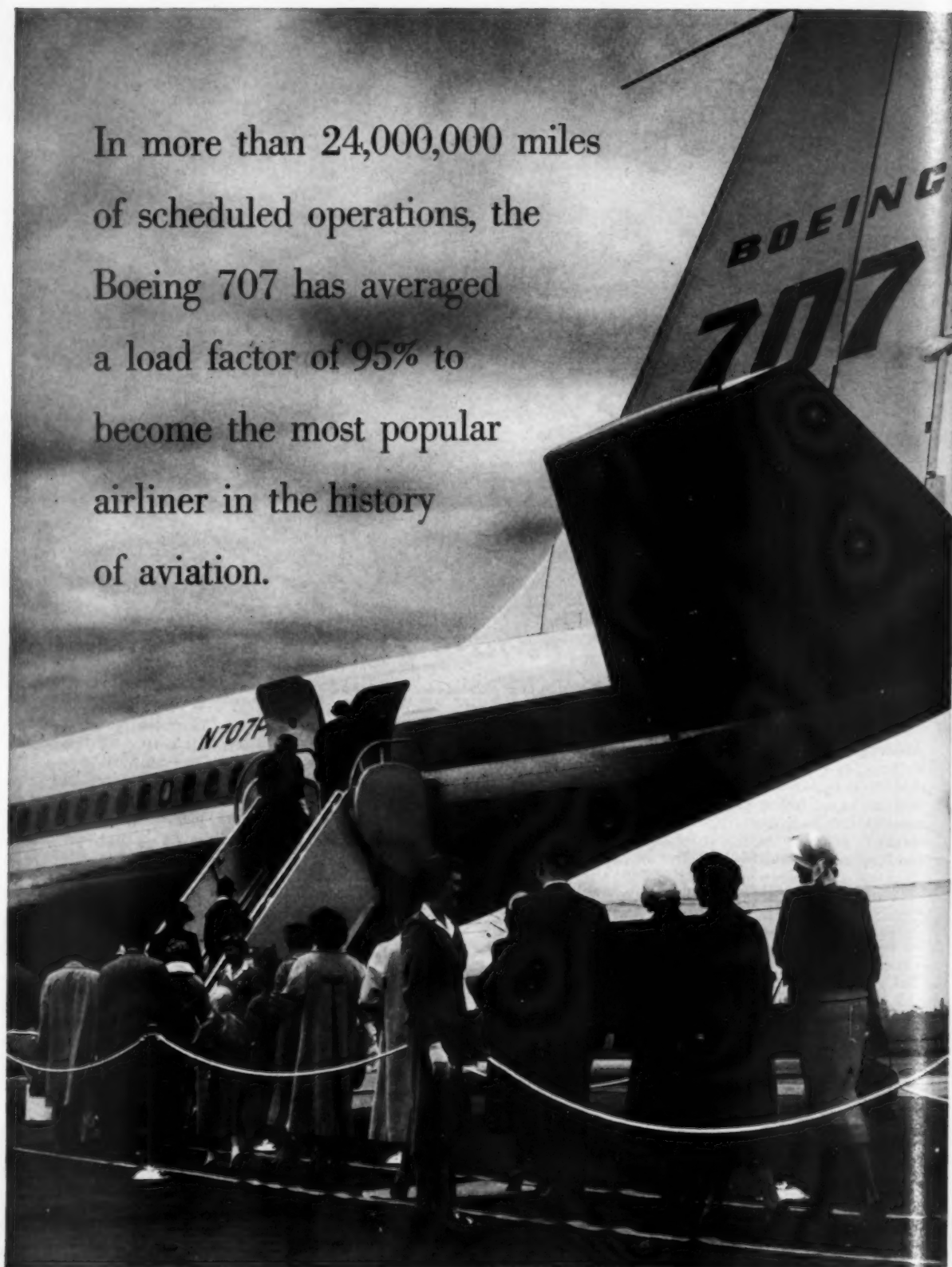
WEST FROM THE WORLD LEADER IN JET-PROP AIRCRAFT...VICKERS

VANGUARD

POWERED BY FOUR ROLLS-ROYCE TYNE ENGINES

VICKERS-ARMSTRONGS (AIRCRAFT) LTD. • WEYBRIDGE, ENGLAND • MEMBER COMPANY OF THE VICKERS GROUP

In more than 24,000,000 miles
of scheduled operations, the
Boeing 707 has averaged
a load factor of 95% to
become the most popular
airliner in the history
of aviation.



*These airlines have ordered Boeing 707 or shorter-range 720 jetliners: AIR FRANCE • AIR-INDIA • AMERICAN • B.O.A.C. • BRANIFF
CONTINENTAL • CUBANA • IRISH • LUFTHANSA • PAN AMERICAN • QANTAS • SABENA • SOUTH AFRICAN • TWA • UNITED • VARIG • Also MATS*

BOEING family of jetliners

Mr. Airline President: You're Underpaid!

By DONALD A. MORRISON
Associate, McKinsey and Company, Inc.

CHIEF EXECUTIVES of America's leading airlines are markedly underpaid when compared with their counterparts in companies of equivalent size. This conclusion, while certainly not new or startling, was firmly reinforced in findings of the fifth annual executive compensation survey by McKinsey & Company, New York consultants.

The survey analyzed the financial results and compensation data of 791 companies. The findings, covering 23 major industries, include air transport for the first time.

In 1958 the compensation of top executives in the 13 major airlines studied continued to lag considerably behind the all-industry average for companies of comparable size. In only one case was the top airline salary higher than the average compensation level of the 22 other industries and in only two other instances was airline pay reasonably close to the average.

The pay of the 13 chief airline executives averaged \$62,000 while top managers of comparable companies studied received an average of \$85,000. In short, other industries pay their chief executives an average of 37% more than the 13 airlines.

It is difficult to determine the factors that explain or justify this significant gap. Results of the McKinsey survey indicate that top airline salaries are not as closely tied to either profits or revenues as in other industries.

In the recession year 1958 all-industry profits were down 11.7%. In the face of this general business down-turn, the 13 airlines boosted profits an average 31.8%. This was by far the highest increase in profits of all 23 industries studied, yet the average pay increase to senior airline officers was less than 1%.

Contrast this with the tobacco industry, for example, which boosted its chief executive compensation 8% when profits rose by a less impressive 19.1%. Although there may be some attempt on the part of the airline industry to use profit-based compensation plans, little correlation could be found between company profit performance and changes in top executive compensation.

In general, industry sales dropped 3.1% in 1958 and, as might be expected, average top executive compensation declined 1.8%. The air transportation industry, on the

How the Airlines Pay Their Chiefs

AIRLINE	SALARY	AIRLINE	SALARY
American	\$85,000	Northeast*	\$48,000
Braniff	72,000	Northwest	67,333
Capital	59,517	Pan American	60,000
Continental	53,167	TWA*	42,000
Delta	53,396	United	100,000
Eastern	47,396	Western	67,900
National	48,000	*Adjusted to annual rate	

other hand, experienced a 5.4% rise in revenues, yet their executive pay remained relatively insensitive to this change.

Air transportation was found to have the lowest correlation between sales performance and executive pay of all 23 industries studied. It was further concluded that less than half of the variation in air transportation executive compensation could be attributed to company revenue performance. Thus more than half of the variation is tied to factors not easily measured, perhaps peculiar to the industry.

Such factors might work toward the securing of route awards or government subsidies. This kind of highly competitive activity could, in this case, be more important determinants of compensation change than the usual yardstick of industry at large; namely, sales volume.

What of the second, third, and fourth highest paid executives in the air transportation industry? Here's how they stack up in terms of compensation as a percentage of the top executive's pay:

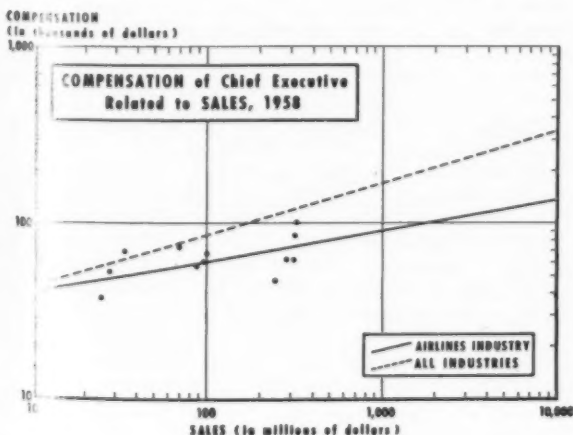
	Air Transportation	All-Industry
Chief Executive	100%	100%
Second Highest Paid	74	73
Third Highest Paid	61	60
Fourth Highest Paid	60	55

Although the pay of these airline executives is a little closer to their top executive than their all-industry counterparts, their compensation in terms of actual dollars is significantly below that of industry at large. Take the average compensation of the fourth highest paid airline executive (60% of \$62,000), \$37,200. This does not stack up very well against his all-industry counterpart who makes \$46,750.

As far as supplementary compensation is concerned in the air transportation industry, none of the companies included in the survey reported stock options, while all 13 airlines did offer pension plans. Only three companies provided contractual arrangements under which, for example, a man would be paid a fixed amount for a period of, say, ten years after retirement for consulting services.

It is recognized that each industry must, when determining compensation levels, consider a number of factors peculiar to it. But can the air transportation industry justify executive compensation levels that are so drastically out of line with industry at large?

At present there is intense competition between companies and industries for high-caliber executive talent. Now that the newness and glamor of the air transportation industry is fading, it is fair to ask how much longer it can continue to attract and keep the top-quality executives it needs with the salaries it is currently paying. Can the airlines afford the eventual price of low pay—losing out to others in the competition for career managers?



Express Deal: More Cash For Airlines

A HISTORIC MILESTONE has been reached in air express.

For the first time in the more than 20 years that they've been doing business with Railway Express Agency, domestic airlines have succeeded in getting a major overhaul of their contract with the agency.

The carriers say it's the greatest thing that's happened in air express. It means more dollars for them. They have an equal say in the conduct of the business. There's a real incentive to develop traffic.

Air express has grown over the past several years, although not as rapidly as other traffic (ton-miles up 17.6% from 1951 through 1958). The benefits of growth haven't been realized by the airlines. The more business they did, the less they received out of the air express dollar. Reason: a contract that guaranteed the railroad-owned REA its costs, overhead, sales expense and a profit.

This agreement has been scrapped, and for the first time air express is a partnership. Each party shares the risks and profits; each will be better off as traffic grows.

And there's plenty of evidence that express is bouncing back from effects of the 88-day strike in 1957. Last year's revenues gained 11.4%. This year they're 20% ahead of 1958. Forecast for 1959: \$48.7 million against \$41 million in 1958. Forecast for 1960: \$52.3 million.

Under the old contract, all of REA's costs were guaranteed (sometimes even retroactively, such as wage increases negotiated with unions). It then received 9½% of these

costs as overhead, 3% of total gross revenues for "sales effort." After all these deductions, it was allowed 19.31% of the remaining gross as profit. What was left went to the airlines.

Result: In 1951, when air express revenues were \$30.6 million, airlines received 51¢ out of each dollar. In 1956, revenues had risen to \$42.1 million, but carriers received only 48.2¢. Last year, their share was 45.2¢. As volume increased, REA's share went up.

Here's how the new five-year deal works: Before there is any division of total air express revenues, certain items are deducted "off the top." One is advertising expense. Advertising is handled by REA, but the ad campaign is decided jointly with the airlines and will generally run about 1½% of gross revenue. Another deduction is cost of transferring shipments between airlines at major airports. Formerly, carriers paid this—a sum approaching \$1 million a year. After deductions, revenues split 50-50.

Thus, to make more money, REA—with no guarantees—must aim to cut costs and increase volume. Likewise, airlines will push for volume. Formerly, they had little incentive—if they upped revenues they never knew whether they would receive any of the benefit or whether most of the gain would be eaten up by REA's higher costs.

The new deal also provides for a joint REA-airline committee which will decide on rates, conditions of carriage, pickup and delivery, etc. This committee has co-chairmen, one REA and one airline. There are only two votes—the co-chairmen—and decisions must be unanimous; each side has a veto. With this method it's harder to reach decisions, but they are better decisions when they're finally hammered out, airline officials say.

Result of the new contract will be that airlines will come closer and closer to receiving 50% of revenues, although they will never reach that figure because of the deductions made before the 50-50 split.

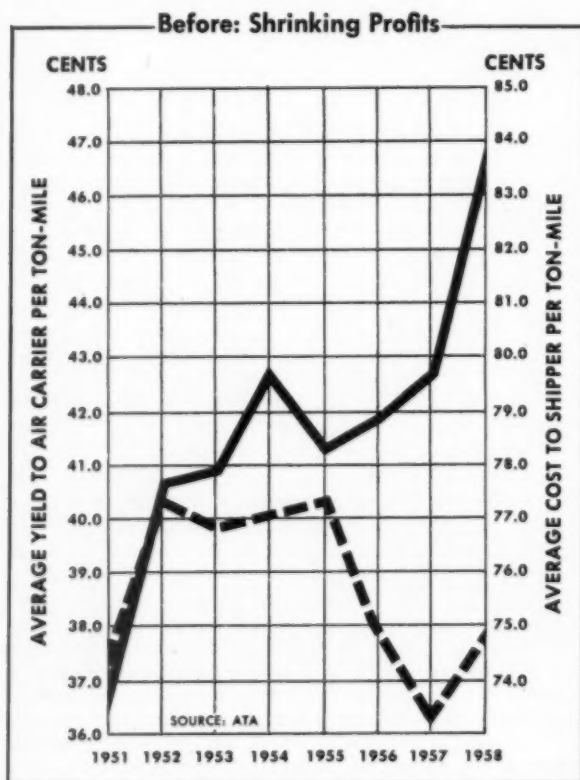
Why was it possible to get a new contract now? First, airlines were in a position to deal from strength. They have a ground organization for pickup and delivery of air-freight that could take over express. REA was no longer indispensable.

Second, carriers for the first time named a negotiating committee and gave it the authority to conclude an agreement for the industry. Formerly, REA signed with each airline. Although the contract was a standard one, its terms sometimes reflected concessions made before the final signing by one airline as against the others.

Heading airline negotiators was Paul Brattain, retired v.p. of Eastern Air Lines. Members were Charles R. Speers, senior v.p.-sales, American; Clarence Belinn, president, Los Angeles Airways; L. J. Eichner, v.p.-traffic and sales, Trans-Texas; J. E. Moore, v.p., United.

Also making agreement possible was REA's new, progressive management, headed by William B. Johnson, former general counsel of the Pennsylvania Railroad. Arriving on the scene when the REA situation was chaotic, he has salvaged all but one of its 178 rail members and gained new operating freedom. This new freedom led to the revised air express deal with the airlines.

Solid line: shipper cost; dotted line: carrier yield.





Another Operating PLUS for
United Air Lines DC-8
Jet Mainliners

The B&H **JETCAL[®]**
ANALYZER

ASSURES... *maximum range,*
lower operating costs,
greater dependability
of schedule operation,
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TESTS EGT SYSTEM ACCURACY to $\pm 4^{\circ}\text{C}$
(functionally, without running the engines).
RUNS TEMPERATURE SPREAD CHECK on TWO ENGINES
at SAME TIME. CUTS TEST TIME 50%.
TESTS RPM ACCURACY to 10 RPM in 10,000 RPM ($\pm 0.1\%$).
CHECKS HEAT, ANTI-ICE and FIRE DETECTION SYSTEMS.

The JETCAL[®] is in worldwide use...by the U.S. Air Force and U.S. Navy as well as by major aircraft and engine manufacturers...and air lines. Write, wire or phone (EDison 6-7243) for complete information.



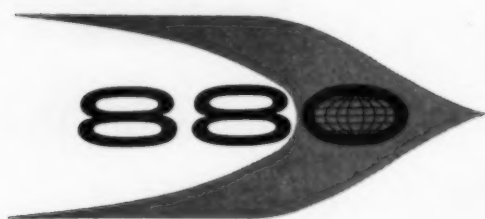
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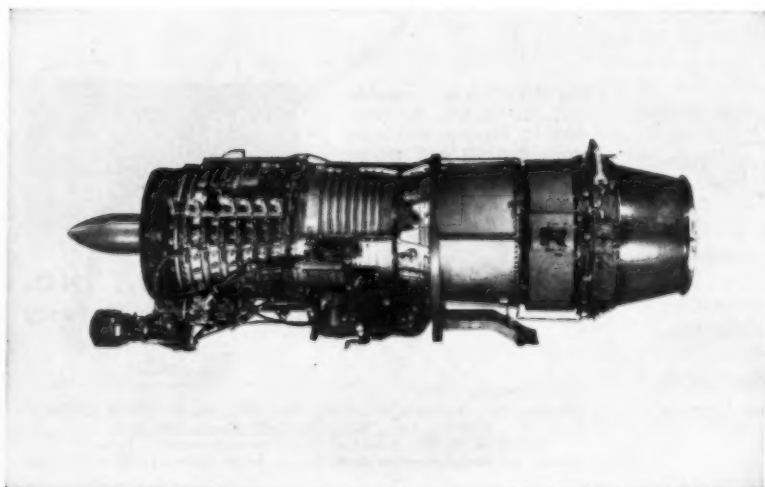
ATLANTA, GA., COMPTON, CALIF., DAYTON, OHIO, VALLEY STREAM, L.I., N.Y.,
WICHITA, KAN., TORONTO, ONT. (George Kelk Ltd.),
MITCHAM, SURREY, ENGLAND (Bryans Aeroequipment Ltd., Exclusive
licensee and manufacturer for Great Britain, British Commonwealth and Europe)

Convair



exceeds performance specs

General Electric's CJ-805 jetliner engine shares in an outstanding aviation achievement: in flight tests the CJ-805 powered Convair 880 has not only bettered all performance guarantees, it has met or bettered even drawing board estimates for speed, range and short distances required for take-off and landing. For airlines and their passengers, these flight test results demonstrate how the 880 will go more places and provide the world's fastest, most versatile air transportation. Powered by dependable General Electric CJ-805 turbojets, the Convair 880 will be years ahead for years to come.



TAKE-OFF less than 5,450 ft.

Flight tests have proved that the 880 can lift off before reaching the 5,450-foot mark* originally estimated. Flight experience indicates that actual runway length needed for take-off may prove to be as much as 5% less. CJ-805 performance has been outstanding throughout Convair's continuing test program. Supporting this record was thorough G-I flight and ground testing which provided information for engine improvement prior to 880 testing. Extensive flight and ground testing continue. *(see level standard conditions—typical 1,000-mile trip.)

Outstanding CJ-805-3 performance has helped the Convair 880 exceed performance guarantees for speed, range and short distances required for take-off and landing.



SPEED
615 mph

Four CJ-805 turbojets have provided power for Convair 880 cruise at true air speeds of 615 mph—above guarantee and faster than any other commercial passenger plane in the world. Six months of intensive flight testing have proved speed. 615 mph flights have been powered routinely by CJ-805 engines equipped with reversers and suppressors, demonstrating minimum thrust losses. Engine, thrust reverser and sound suppressor have been produced and tested together by G.E. so their performance is especially well matched.

RANGE
3,450 miles

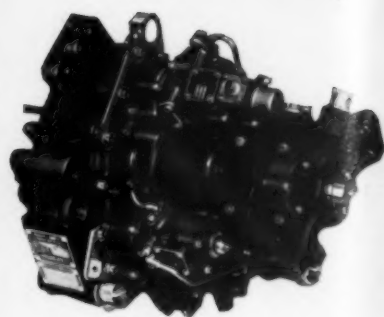
Engineering estimates of the 880's range and fuel economies have been confirmed by data accumulated during 250 hours aloft on 130 flights. Flown for best economy, the 880 will range 3,450 miles. Excellent CJ-805 SFC's make an especially important contribution. The 880 was designed and built to operate from most present-day airports. Proved range makes the 880 even more versatile by permitting non-stop jet 880 service between metropolitan centers as well as on shorter routes. The 880 can go more places.

LANDING
less than 5,350 ft.

880 landing tests show that the estimated 5,350-foot landing distance may be considerably shortened. In tests, only aircraft brakes were used. Thrust reversers, which provide reverse thrust equal to 48% of forward thrust, can reduce landing distance even further. Short take-off and landing is another reason the 880 can go more places. The CJ-805, which helps make 880 performance outstanding, is the result of knowledge and experience gained in more than 23 million G-E jet flight hours. *General Electric Company, Cincinnati 15, Ohio.* 237-33

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Labor Speaks



By **ROBERT E. COMMERCE**
Pres., Air Line Dispatchers' Assn.

Dispatchers Have the Answers To Jet Efficiency

THE CHANGING CHARACTER of dispatching to the airlines is a far greater challenge than solution of dispatch labor issues. We have had virtually no labor trouble in 21 years of dealings with 27 airlines.

The jet age has heightened dispatchers' responsibilities. It's pure folly to assume everyone knows what a dispatcher does. This behind-the-scenes task is many times removed from public attention. Let's examine it.

Under FAA rules, dispatchers are responsible for: (1) Converting meteorological data into terms of operational probability, (2) Determining minimum fuel requirements, (3) Providing flight watch, (4) Advising the pilot of changes that may affect the safety of the flight, (5) Determining alternate courses of action.

In these operations he shares equal responsibility and authority with the pilot. His corollary duties are economic in nature. These include when to consolidate, connect, reroute, originate, or when to substitute equipment. Why do airlines place this control in dispatch? Simply because no one else in operations can furnish dispassionate impartiality, around-the-clock continuity of policy, conservatism, and long experience (national average 14 years).

The industry is coming to regard the dispatcher primarily as an expeditor, policy man, dollar-maker. Decisions involving millions of dollars in equipment, and operating revenue, pass through his hands hourly. Airlines have made him the watchdog of on-time operation because reliability is the key to load factors. It is here scheduled airlines hold the advantage over irregulars.

As aviation approaches the distant goal of all-weather flying, some aspects of dispatch become routine. Humdrum aspects of flight following are being relegated to traffic control. Minor weight and balance chores are becoming station functions. Altitude changes no longer need be acknowledged. Streamlining procedures frees the dispatcher for decision and planning.

Each advance in equipment complexity has brought

changes in dispatch methods. No longer may we flirt with "busts", attempted or aborted flights that scatter equipment and crews, often to off-line points. Too many passengers are involved, too many airports are inadequate, rail forwarding has deteriorated, costs have skyrocketed.

Dispatchers have learned the truth of General "Smoky Joe" Caldera's statement that "the jet is not just another bird." Sound planning with safety now requires the additional question: "Can we fly it and still make money?"

Planning of a jet flight begins hours before the pilot reaches the field. Nothing is left to chance, and a smooth operation is not accidental. Common sense, together with the expense of jet crew duty time, puts this planning in flight control. Turbines are notorious fuel hogs. Minimum consumption tracks must be planned, optimum altitudes selected, alternates chosen.

Slight deviations may shave profits to a whisker; major deviations can break you. Jets have every luxury except that of leisurely choice and cannot afford, as pistons do, to come down for a look when the outcome is in question.

Has the character of dispatch changed only with jets? No. Consider the recent shift in the nation's air route structure. Large carriers divested themselves of unprofitable feeder routes, which the CAB allocated to local service lines. Dealing with narrow profit margins, the local service dispatcher has to plan with greater vigor because he stands deeper in the shade of the dollar sign. His safety function is not lessened, though half of his decisions are economic.

One large company's operating manual states: "A good dispatcher is a product of his own company's environment" and goes on to say you can bring flight instructors and management people in from the "outside" but not so with dispatchers because their ideal training, both economic and safetywise, must come from within the company. The dispatcher's entire stock in trade is judgment, and, although part of his vast reservoir of knowledge comes through study, most stems from years of experience.

What of the safety angle? Have conditions so changed since the thirties, when dispatching was created, that safety is now automatic? I know pilots, fighting for simple, safe essentials who would hoot with laughter at that suggestion. Safety is never automatic. The natural limitations of the cockpit have made it necessary that competent ground assistance be always available to the pilot. While "flexibility" is a tool of operational safety, it is not synonymous with "laissez faire." It is not achieved by throwing the regulations out the window.

But would enlightened management put the emphasis on economics to the impairment of safety? I have my reservations, but a profoundly respected dispatcher, Willard Edson, of United Air Lines, who has dispatched since 1930, says, "If the license requirement were removed tomorrow, I have confidence the repeal would not vacate the dispatch office."

Why has licensing withstood the assaults of employer groups, even gained acceptance abroad in countries like Sweden, Mexico, Turkey, Japan, Holland? Simply this: standards of competency establish responsibility. Please observe I did not say "authority", which is often given with reckless disregard for public interest.

"Licensing", states Edson, "gives incentive for real responsibility. People seek authority but they seldom want the responsibility that accompanies it." Living with heavy responsibility has been the daily fare of the dispatcher. The bright shield that sustains him is his ticket.

How do pilots feel about this? A prominent ALPA officer told his members, "Of this you can be sure, you're going to have operational control. Now the questions boil down to, 'Do you want competent, licensed men performing this service, or do you want ribbon clerks?' The choice is obvious."

AIRLIFT at Farnborough—1959

FARNBOROUGH, ENGLAND—The Society of British Aircraft Constructors' "home show" of aviation this year served up its usual diet of air transport unveilings. Among first appearances were Handley Page's Dart Herald, Vickers' Vanguard and Armstrong Whitworth's Argosy cargo transport.

New models or mockups ranged from fan engines by both Bristol and Rolls-Royce to such futuristic items as a hovercraft by Westland/Saunders Roe.

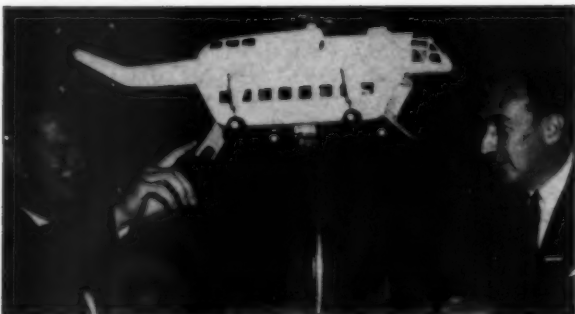
Here *AIRLIFT* presents an exclusive picture report covered by editors Anthony Vandyk and Jean-Marie Riche.



Oliver Tapper of de Havilland shows *AIRLIFT*'s Anthony Vandyk the Airco DH. 121's centrally mounted Rolls-Royce RB. 163 engine. BEA has ordered 24 transports. The first will fly in 1961.

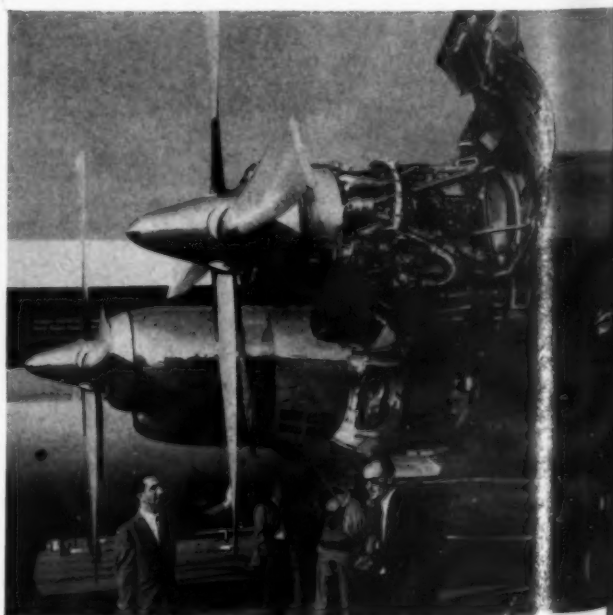


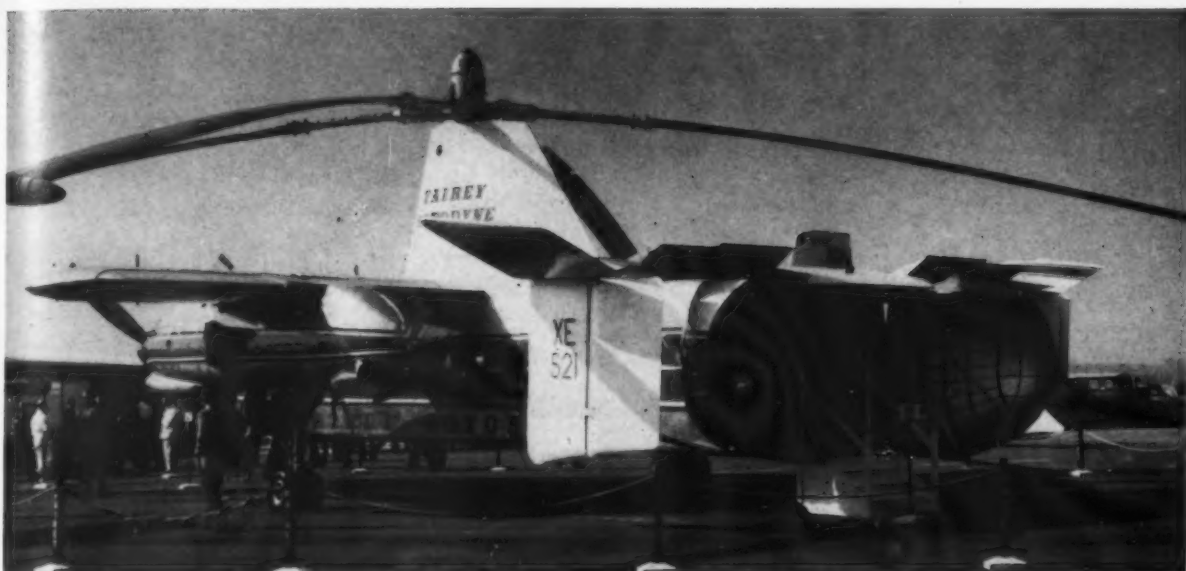
Handley Page Dart Herald was shown for first time. British European Airways will operate three on its Scotland routes next summer.



L. Thornhill and W. Hinks of Westland point out features of the Westminister crane transporter, with Eland engines.

The Vickers Vanguard, which will enter service with British European Airways next spring. Photo shows Rolls-Royce Tyne opened up.





Clamshell doors at rear of Fairley Rotodyne make it suitable for use as a car ferry or freighter.

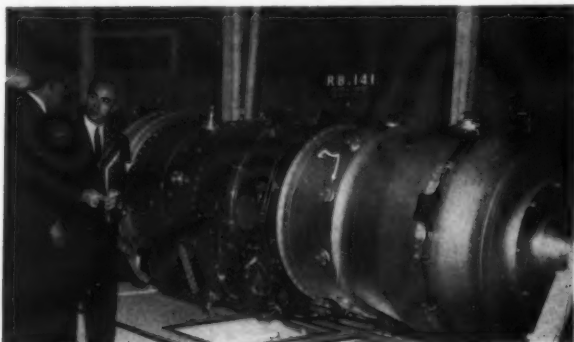


Hunting Aircraft's Sales Manager D. M. Bay points to H-107, twin-Orpheus-powered transport.

Mark Howard, Sales Manager of Short Bros. and Harland, stands behind a model of Britannic, designed for RAF's Transport Command.



David Whaley of Bristol Siddeley (left) shows new BE 58 fan engine which develops 14,500 lbs. thrust for 2,600 lbs.



AIRLIFT's Jean-Marie Riche discusses with James Gill of Rolls-Royce the RB.141 fan engine for Sud-Aviation's Caravelle.



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More speed for Convair's Naish

A few years ago *The Saturday Evening Post* ran an article on the Lockheed Aircraft Corp.'s bent toward faster airplanes under the heading "Merchants of Speed." Looks as though Convair is out to grab the title. Latest gossip in supersonic transport circles is that Convair's designers ain't fooling around at mach 3 in their studies, but are already projecting a mach 5 job. Do you suppose this means Jack Naish, Convair president, has been getting together with Roy Marquardt, the big ramjetter, lately?

Jets for Business Planes

Jim Pfeiffer, North American Aviation commercial aircraft marketing manager, and Art De Bolt, Sabreliner project head, recently completed a tour of the country spot checking corporations to see how much interest they might find, if any, in a commercial model of NAA's twinjet T-39 Sabreliner. Next time around they may take their receipt books along and accept deposits. Indications are that the data they picked up was mostly on the plus side.

Decision on a commercial Sabreliner for the business aircraft market has been hanging fire almost since the day NAA finished building the original prototype to enter in the Air Force's off-the-shelf UTX competition. NAA has been trying to be realistic in evaluating market data. How many Sabreliners would it have to sell to make a commercial project worthwhile? What's a possible breakeven number? Someone suggested 60 to 75 airplanes. "Yes?" questioned board chairman Dutch Kindelberger. "Douglas has sold 140 DC-8s and still isn't even," NAA brought in Pfeiffer,

former v.p. of Fairchild and an old hand in commercial transport sales, to run down the commercial answers.

Good Military Sales Prospects

North American's military T-39 order from the Air Force is for an initial quantity of 11, but a production order—probably for 35—is in the works and the west coast manufacturer can reasonably count on follow-ons in future fiscal years in proportion to the funds available. As for all aircraft which might transport other than air personnel, FAA type certification of the T-39 is an Air Force requirement. This means re-certification of a commercial version would be a simple matter and relatively inexpensive.

It also seems likely NAA might have a price advantage in a venture into the business aircraft field. Fairchild recently upped the price of the F-27 to \$885,000, and this is for an airline interior. An F-27 with an executive-type interior would cost more. Grumman prices the Gulfstream at \$845,000 for the bare airplane. Adding instrumentation and an interior boosts the price to about \$1,030,000. For Lockheed's JetStar, one recent sale contract, which probably can be counted as typical, came to approximately \$1.2 million. McDonnell's Model 119 is reported even more expensive, closer to \$1.5 million. NAA, it is estimated, should be able to price the twinjet Sabreliner fully equipped at no more than three quarters of a million, perhaps a little less.

Lightweight 880 Proposed

Convair is getting worked up over plans for a junior 880 with turbofan power to compete with the proposed Douglas DC-9 in the short and medium range market. Big issue within the Convair plant is whether to leave the present 880 as it is dimensionally—with 88 seats—or to take out a couple of fuselage segments and convert to a shorter aircraft to carry 80 passengers. Using four turbofan engines of approximately 10,000 pounds thrust each, the present 880, which has a design maximum takeoff weight of 184,500 pounds, might be reduced to about 157,000 pounds. The shorter version could be turned out at about 148,000 pounds. Convair's engineers would prefer to leave the 880 dimensions as they are. It would be cheaper. But Convair's sales department thinks the smaller plane might have the airline appeal for shorter routes.

British Engine for Allison

Most of the conversation on power for medium jets has centered around Pratt & Whitney's JTF10. But Rolls-Royce has a new turbofan engine which is very much in the running. Douglas has disclosed that the JTF10 for the DC-9 will develop 8,250 pounds thrust. GE describes its CJ810 as being in the 7,000 to 9,000-pound thrust range. The Rolls-Royce RB163 is in the 10,000-pound thrust class. It's just the fit for a junior 880. This also is the engine which the Allison division of General Motors would produce in this country under license agreement if it is selected to power one, or more, of the medium jets now in the planning stage. Actually, it is Allison that is conducting the negotiations currently going on with both Convair and Boeing. Moreover, Douglas, even though it has picked the P&W JTF10 for the primary power plant for the DC-9, is keeping itself informed on RB163 developments just in case a customer might come up with a request for an alternate engine.

Boeing Keeps Struggling

Boeing continues to be torn between three designs for its 727. One is for a twin-engine airplane which would have a design maximum takeoff gross weight of 110,000 pounds and 1,250 square feet of wing. It would be powered by two P&W JT3D turbofans having 17,000 pounds thrust each. American and TWA are two potential customers who are said to look with favor on a twin-engine airplane.

Another is an airplane with the same wing and the same takeoff gross weight, but incorporating a butterfly tail and three engines. These engines might be the Allison-produced 10,000-pound Rolls-Royce RB163s. Eastern Air Lines is said to feel that the idea of a third engine makes sense.

Two Four-Engine Ideas

For a four-engine airplane Boeing's designers have been studying two configurations. One would be a junior 720, cutting back both wing and fuselage to provide an aircraft having a design maximum takeoff gross weight in the area of 130,000 or 140,000 pounds. This junior 720 might use four RB163 engines or four P&W JTF10s. Boeing's other four-engine idea would entail a design lighter and smaller than the DC-9. It's a configuration which might appeal to a number of carriers, but the problem is lack of an engine that's just the right size.

ON TIME PERFORMANCE—JULY 1959

	Rank	June on Time Pct.	On Time to 15 min. Late	On Time to 5 min. Late	4-15 min. Late	16-30 min. Late	Over 30 min. Late	Trips Reported
TRUNKS								
American	3	71.7%	75.7%	57.4	18.3%	7.2%	17.1%	6282
Braniff	1	80.1	83.5	61.9	21.6	9.0	7.5	1485
Capital	..	55.2	NA	NA	NA	NA	NA	NA
Continental	5	68.2	70.2	45.4	24.8	17.4	12.4	1156
Delta	7	63.6	65.6	35.7	29.9	20.1	14.3	1704
Eastern	8	66.8	64.8	39.9	24.9	18.0	17.2	5695
National	10	48.3	46.5	30.6	15.9	20.5	33.0	912
Northeast	9	55.7	51.2	34.4	16.8	16.2	32.6	3333
Northwest	..	55.2	NA	NA	NA	NA	NA	NA
TWA	6	NA	66.3	48.2	18.1	14.1	19.6	2936
United	2	77.7	82.5	61.2	21.3	9.1	8.4	4487
Western	4	71.5	75.5	51.5	24.0	14.1	10.4	1087
LOCAL SERVICE								
Allegheny	9	59.1%	50.0%	27.5%	22.5%	15.3%	34.7%	294
Bonanza	5	71.5	80.1	67.6	12.5	8.0	11.9	336
Central	1	92.0	95.0	78.7	16.3	2.5	2.5	80
Frontier	4	82.7	83.4	64.6	18.8	7.9	8.7	291
Lake Central	3	78.3	84.6	62.0	22.6	7.7	7.7	142
Mohawk	8	60.8	60.7	36.1	24.6	20.5	18.8	1109
North Central	6	81.54	77.9	54.8	23.1	12.6	9.5	1394
Ozark	2	88.3	92.2	58.7	33.5	6.5	1.3	771
Pacific	..	81.4	NA	NA	NA	NA	NA	NA
Piedmont	6	75.8	66.7	40.0	26.7	20.0	13.3	30
Southern	7	73.1	66.4	33.1	33.3	24.8	8.8	423
West Coast	1	89.2	95.0	85.7	9.3	3.9	1.1	279
BOEING 707								
American	2	27.3%	42.3%	26.3%	16.0%	17.6%	40.1%	688
TWA	3	..	34.5	21.4	13.2	19.3	46.1	589
Continental	1	30.1	53.1	29.4	23.7	26.6	20.3	177
LOCKHEED ELECTRA								
American	1	79.6%	74.7%	55.4%	19.3%	13.2%	12.1%	1041
Braniff	2	..	69.1	44.2	24.9	17.5	13.4	172
Eastern	3	63.0	63.7	40.1	23.6	18.1	18.2	1451
National	4	33.8	29.1	10.8	18.3	24.3	46.6	148

NA—Not available. Carriers failed to report by deadline. Nonstop and one stop flights only.

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Jets Continue to Lag; Braniff Still on Top

Braniff Airways during July registered an 83.5% "on time" performance record to lead the domestic trunk airlines in schedule reliability for the second successive month.

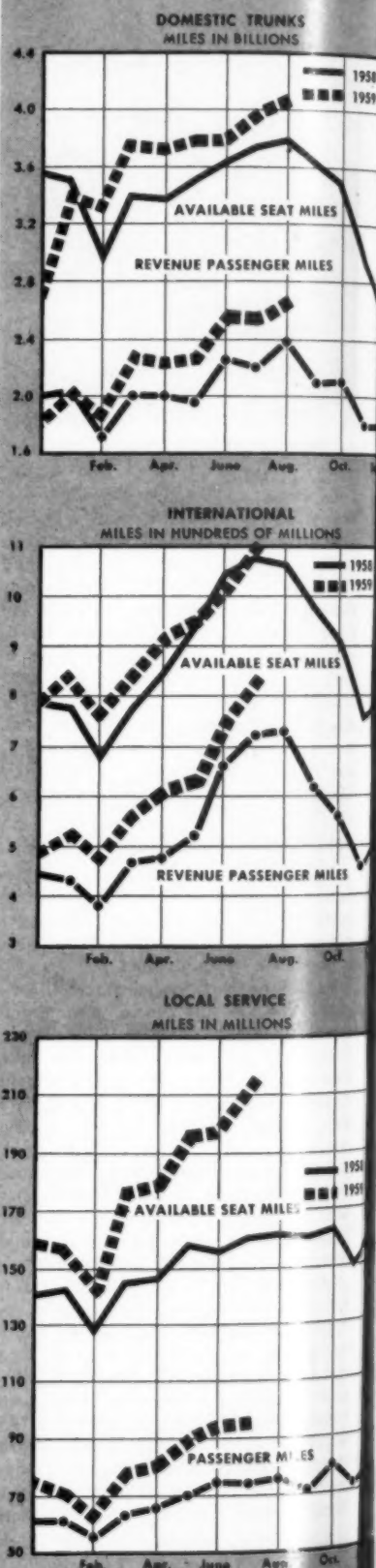
In No. 2 position was United with 82.5% and No. 3 American at 75.5%. The trunks' performance ranged from Braniff's 83.5% to National's 46.5%. The record for Capital and Northwest was not on file with CAB on the 15th of the month deadline.

In jet operations, Continental Air Lines became the first carrier to exceed 50% on time in 707 service with a 53.1% performance in July. American reports showed 42.3% and TWA 34.5% in the same period.

The Lockheed Electra continued to fare well, again almost matching the schedule reliability of piston types with years of operating experience. For AA, Electra on time ran 74.7%, for Eastern 63.7% and for Braniff 69.1%.

Among the local airlines, Central Airlines again repeated its June on time leadership with a 95% record in July for 80 flights affected by the CAB reporting rule. Ozark rated second with 92.2% of 771 flights on time and Lake Central was No. 3 at 84.6% on time.

HOW'S TRAFFIC Among U.S. Airlines



U.S. Airline Traffic for July 1959 vs. 1958

This complete summary compiled by AIRLIFT Magazine from Official CAB data

	Revenue Passengers (000)			Revenue Passenger Miles (000)			Total Ton-Miles Rev. Traffic			% Available Ton-Miles Used	
	1959	1958	% Change	1959	1958	% Change	1959	1958	% Change	1959	1958
DOMESTIC											
American	481	415	10.7	549,538	457,854	20.0	63,804,019	53,750,022	18.7	62.3	56.4
Braniff	169	165	2.4	75,475	72,549	4.2	8,394,571	7,960,239	5.5	46.4	46.4
Capital	320	320	0.0	129,139	126,280	2.3	13,507,812	13,209,202	2.3	49.3	44.5
Continental	103	75	37.3	70,484	39,775	77.2	7,173,978	4,143,617	73.1	50.2	40.6
Delta	249	217	14.7	124,369	106,895	16.3	13,939,586	11,890,192	17.2	50.2	50.6
Eastern	706	629	12.2	388,179	343,125	13.1	40,159,991	35,412,806	13.4	41.9	46.3
National	135	112	20.5	82,510	65,901	25.2	8,775,705	7,112,087	23.4	45.1	43.2
Northeast	120	92	30.4	46,584	32,360	43.9	4,681,955	3,286,317	42.5	42.0	38.0
Northwest	165	141	17.0	130,817	110,972	17.9	14,571,452	12,059,738	20.8	52.0	49.5
Trans World	446	395	12.9	434,076	367,470	18.1	45,926,164	38,918,748	18.0	65.7	60.0
United	648	592	9.5	468,844	464,028	1.0	54,742,793	52,928,175	3.4	62.4	56.2
Western	140	113	23.9	81,295	60,946	33.4	8,401,677	6,317,403	33.0	52.0	43.5
TOTALS	3,882	3,466	12.0	2,581,310	2,248,155	14.8	284,079,705	246,988,546	15.0	54.5	51.9

INTERNATIONAL											
American	10	11	-9.1	10,674	10,477	1.9	1,345,196	1,379,136	-1.0	71.7	57.3
Braniff	5	4	25.0	8,434	8,098	4.1	1,050,549	1,006,229	4.4	51.6	46.8
Delta	5	5	0.0	5,667	5,760	-1.7	669,407	679,596	-1.5	46.0	45.2
Eastern Overseas	46	44	4.5	67,506	63,067	7.0	7,144,461	6,673,015	7.1	77.5	69.2
San Juan	37	33	12.1	56,572	50,962	11.0	5,936,234	5,348,615	11.0	87.4	73.7
Bermuda	5	7	-28.6	4,309	5,578	-22.8	448,569	575,091	-22.0	46.1	60.1
Mexico	4	4	0.0	6,625	6,527	1.5	759,658	749,309	1.4	52.4	53.1
National	9	10	-10.0	5,553	6,279	-11.6	645,671	724,247	-10.8	54.1	56.7
Northwest	21	15	40.0	41,470	35,710	16.1	4,539,031	4,003,177	8.9	67.2	73.7
Hawaiian	3	2	50.0	8,261	6,578	25.4	885,283	513,987	72.2	77.7	64.0
Panagra	11	11	0.0	16,731	13,732	21.8	2,438,677	2,019,715	20.7	63.4	54.7
Pan American System	314	281	11.7	489,180	412,467	18.6	61,820,765	52,371,395	18.0	69.9	64.2
Latin America	140	120	16.7	165,119	129,127	27.9	20,066,889	16,351,623	22.7	71.6	66.5
Atlantic	134	130	3.1	192,649	182,079	5.6	24,322,216	22,429,268	8.4	65.4	61.9
Pacific	33	25	32.0	124,714	94,536	31.9	16,474,028	12,746,078	29.2	75.5	75.4
PDX/SEA-HON.	2	1	100.0	5,540	3,135	76.7	612,190	426,064	43.7	62.7	48.7
Alaska	7	6	16.7	7,078	6,725	5.2	957,632	844,426	13.4	67.0	57.9
Trans Caribbean	12	9	33.3	18,670	18,374	1.6	1,721,964	1,626,820	5.8	86.8	88.5
Trans World	43	40	7.5	134,343	116,366	15.4	16,601,443	13,752,059	20.7	71.6	60.4
United	15	12	25.0	36,421	29,035	25.4	3,984,649	3,252,030	22.5	78.4	65.5
Western	5	1	400.0	7,178	1,633	339.6	765,835	181,910	321.0	63.0	35.4
TOTALS	496	443	12.0	841,827	721,006	16.8	104,747,648	89,669,329	16.8	70.1	65.0

LOCAL SERVICE											
Allegheny	50	45	28.9	10,291	8,190	25.6	1,037,961	828,821	25.2	47.3	48.0
Bonanza	21	15	40.0	5,012	3,350	49.6	596,048	336,116	47.6	42.7	40.8
Central	15	13	15.4	2,844	2,410	18.0	294,816	249,044	18.4	34.4	30.3
Frontier	32	23	39.1	7,971	5,170	54.2	875,695	571,460	53.2	41.3	53.8
Lake Central	19	14	35.7	3,000	2,180	37.6	309,283	226,045	36.8	44.6	37.4
Mohawk	46	35	31.4	9,091	7,054	28.9	906,760	708,569	28.0	52.9	47.4
North Central	88	68	29.4	16,260	12,140	33.9	1,688,387	1,219,870	38.4	47.0	48.5
Ozark	48	35	37.1	8,254	5,920	39.4	857,549	606,681	41.3	44.0	45.5
Pacific	44	33	33.3	9,542	7,148	33.5	936,687	703,269	33.2	56.5	48.7
Piedmont	43	34	19.4	9,349	7,589	23.5	944,393	767,679	23.0	45.4	52.7
Southern	24	18	33.3	4,167	3,273	27.3	436,933	339,769	28.6	34.5	37.4
Trans-Texas	25	20	25.0	6,038	4,622	30.6	641,935	494,151	29.9	40.5	39.0
West Coast	29	22	31.8	5,642	4,029	40.0	557,951	401,637	38.9	49.7	46.4
TOTALS	492	377	30.5	97,481	73,075	33.4	9,984,398	7,453,111	34.0	45.4	45.7

HELICOPTERS											
Chicago	21	10	110.0	370	176	110.2	36,573	18,037	102.8	44.8	26.0
Los Angeles	5	3	66.7	182	115	58.3	24,652	16,756	47.1	47.4	62.3
New York	12	9	33.3	223	169	31.9	24,421	18,734	30.4	51.6	44.6
TOTALS	38	22	72.3	775	460	68.5	85,646	53,527	60.0	43.4	38.7

TERRITORIAL											
Caribbean	33	24	37.5	2,271	1,673	35.7	246,244	180,370	36.5	74.5	70.4
Hawaiian	48	49	-2.1	11,247	15,345	-26.7	1,082,025	1,528,708	-29.2	61.2	69.5
Trans Pacific	37	22	68.2	5,537	3,146	76.0	454,419	261,128	74.0	61.3	62.7
TOTALS	118	95	24.2	19,055	20,164	-5.3	1,782,688	1,970,206	-9.5	62.8	68.6

ALASKA											
Alaska	12	6	100.0	12,867	4,046	218.0	1,739,233	801,801	116.9	47.3	50.7
Alaska Coastal	8	7	14.3	762	595	28.1	85,681	69,320	23.4	60.5	63.6
Cordova	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ellis	8	7	14.3	462	389	18.8	52,560	44,402	18.4	67.0	64.2
Nor. Consolidated	3	3	0.0	1,103	850	29.8	232,241	203,277	14.2	62.5	63.6
Pacific Northern	15	14	7.1	14,884	14,055	5.9	2,056,027	1,928,872	6.6	70.5	68.2
Reeve	1	1	0.0	1,299	1,224	6.1	287,703	317,775	-9.5	62.5	62.1
Wien	7	6	16.7	2,732	2,195	24.5	694,750	448,247	55.0	68.6	59.5
TOTALS	54	44	22.7	34,109	23,354	46.1	5,148,193	3,813,694	35.0	68.0	61.7

ALL CARGO											
(Ton million thousands)											
	Mail			Express			Freight			Total All Services ²	
	1959	1958	% Change	1959	1958	% Change	1959	1958	% Change	1959	1958
Aaxico ¹	28	4	—12.5	63	31	103.2	7,385	5,035	46.7	12,700	12,361
Flying T	4	20	—80.0	28	25	12.0	1,544	1,818	-14.0	1,661	4,504
Riddle										6,080	1,566
Slick										582	713
Aerovial										2,362	4,078
Seaboard	406	148	174.3				1,773	1,694	4.7		
Western											
TOTALS	438	204	114.7	91	67	35.8	11,237	9,472	18.6	29,160	26,006

¹ Charter operation only.
² Includes charter, military contract and isolated instances passenger ton-miles in charter operation.
³ Operations on Route 121 suspended through June 30, 1960 (Aaxico).

Executive Bid Pays Off for Collins

Cedar Rapids, Ia.—Collins Radio Co., a long-standing label for front-line airline airborne electronic gear, is broadening its appearance in the radio inventory of light and medium business planes.

Its newest entry: the Model 618F-1 VHF transceiver, a 12.6 lb. communications unit for the light and medium executive aircraft which also can be used by local airlines as a secondary or standby communications system.

The 618F is Collins' fourth major development in the light transport field since it made the big decision to enter this market three years ago. And the decision is paying off. In its fiscal year 1958 (ends June 30), it did between \$2 million and \$4 million business with aircraft customers. Last year it doubled, somewhere between \$5 million and \$6 million.

Before the 618F, Collins successively

introduced the Model 17L-8, a 2.5-lb. 90-channel VHF transmitter, the 51X-3, a 3¼-lb., 190-channel VHF receiver and the 344D-1, a 2.4-lb. omni-converter indicator used with the 51X-3 for localizer or omni-course deviation information.

With these as the working foundation, it has put together a stable of components to fit virtually any light aircraft, light or medium twin, or medium to heavy twin-engine model.

A standard package for light aircraft adds up to 13.15 lbs., a de luxe installation 27.7 lbs. For light twins, it's 69.95 lbs. standard, 159.95 lbs., de luxe, with the bigger additions in the latter being Collins FD-104 flight director (28.5 lbs.) and DF-201 ADF (30.4 lbs.).

For the medium and heavy twins, the inventory increases and Collins' package becomes more complete. For a standard installation, the weight totals 122.1 lbs. and for de luxe, which includes 252 lbs. of autopilot, flight director and airborne radar, the weight is 411.1 lbs.

Within three years, Collins has changed from a "disinterested party" to a name frequently found on the optional electronics lists of business aircraft brochures. It is already offered as a package for the Aero Design group, and Collins is hard at work among the Cessnas, Beeches, Pipers and Mooneys to expand this representation.

Its list of distributors has grown from scratch to about 80 firms throughout the U.S. Its main emphasis is directed at the light twin models or bigger and, as a matter of policy so far unchanged, it only builds equipment that will conform to FAA Technical Standard Orders.

The new 618F-1 fits in this same stable, provides 360-crystal-controlled channels in the 118.0 to 135.95 mc range. It measures 9-7/32" deep, 5¾" wide and 3¾" high for easy mounting in any standard instrument panel.

The transceiver employs a common oscillator for transmit and receive functions, 50-kc spacing and provisions for either single-channel-simplex or double-channel-simplex operation. Transmitter output power is 6 watts minimum. The 618F-1 is adaptable to either 13.75 or 27.5 volt power and uses the Collins 427D-1 completely



Collins' latest for business planes: a 12.6 lb. VHF communications transceiver.

transistorized power supply.

And with its stable of business plane electronics gear fast developing, the Cedar Rapids firm is not overlooking the \$10 million annual business it has built up among the airlines since it sold its first equipment to Braniff Airways back in 1939.

New projects are moving fast. It is deep in the battle for the upcoming doppler radar navaid business with its DN-101 sensor and NC-103 computer. Units are slated for evaluation flights with Pan American and TWA this month. It has shared with Wilcox the bulk of the radar beacon transponder market with its 621A-2.

Not too late again

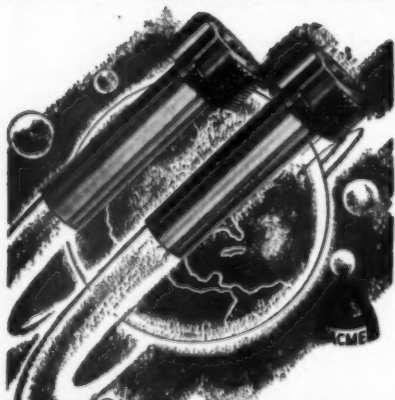
Although it arrived "too late" with its original WP-101 weather radar, it won't be lagging on the next go around as FAA acts to make radar mandatory. Collins is well underway on development of a lightweight radar (WP-102) it feels will put it in this business to stay.

In autopilots, its AP-103 is slated for Trans-Canada Air Lines' Vickers Vanguard turboprops, and the first two prototypes have been delivered. And its AP-102 is being marketed with the FD-107 flight director as an 81-lb. combination for business aircraft.

For the future, says Collins' Paul Wulfsberg, the next big change in airline electronics will be in miniaturization. Transistorized glide slope receivers, localizer receivers, market beacon receivers. It's within the state of the electronics art today to build a completely transistorized airline VHF communications receiver, even a transmitter, but the latter would still have one tube in the back end, says Wulfsberg.

When? Wulfsberg wouldn't venture a guess. But it's a good bet that whenever the airlines are ready, Collins Radio Co. won't be starting from scratch on a new development.

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United Introduces DC-8 Jet Service

United Air Lines will be among the first to inaugurate scheduled transcontinental DC-8 jet service. The new Douglas DC-8's in United's fleet will accommodate 113 passengers with a mail and cargo capacity of 12,000 pounds. Cruising speed is 575-600 m.p.h. To date, United has 40 DC-8's on order.

Pratt & Whitney JT-3's (13,000 pounds thrust) will power 22 of the 40 DC-8's ordered. The remaining 18 will be equipped with the more powerful JT-4 (15,900 pounds thrust). The JT-3 (or J-57 as the military version is called) is the western world's primary jet-turbine engine. Since full-scale production in 1953, more than 14,500 of these engines have logged nearly 3 million hours. A first cousin of the proven JT-3, the more powerful JT-4 (J-75) has an established performance record on advanced Air Force fighters.

There are some interesting statistics on United's DC-8's. For example, each plane can account for upwards of 71,000 passenger miles per hour. Douglas engineers, technicians and flight crews ran up more than 3 million man-hours in testing the DC-8. During the air line certification tests on the JT-3 and JT-4,



Jet age lounge of United's DC-8 jet Mainliner has generous dimensions and smart decor. Cabin pressure is maintained at sea level up to 23,000 feet; at 40,000 feet, pressure compares to 6,700 feet.

engine performance withstood rigorous tests far above operating requirements.

Phillips Petroleum Company, a supplier of aviation gasoline and jet fuel for United, salutes this important jet age achievement.



● A pioneer in the development of aviation fuels, Phillips Petroleum Company is a leading supplier of high octane gasoline, super-performance jet fuels, and aircraft lubricating oils for commercial, private, and military aircraft. And Phillips research continues to lead the way, developing new fuels and lubricants for the aircraft of tomorrow.

AVIATION DIVISION • PHILLIPS PETROLEUM COMPANY • BARTLESVILLE, OKLAHOMA

OCTOBER, 1959

Celebrating GPL's 2



THE RECORD OF THE FIRST 2,000 FIRST SELF-CONTAINED AIRBORNE NAVIGATOR IN THE WORLD • FIRST TO FLY IN A MILITARY PLANE • FIRST TO FLY IN A COMMERCIAL PLANE • FIRST TO FLY IN A BUSINESS AIRCRAFT • FIRST TO FLY IN A MILITARY JET • FIRST TO FLY IN A COMMERCIAL JET • FIRST TO FLY OVER THE OCEANS • FIRST TO FLY OVER THE POLE

s 2000th Doppler system

*four times the combined output
of all other manufacturers in the world!*

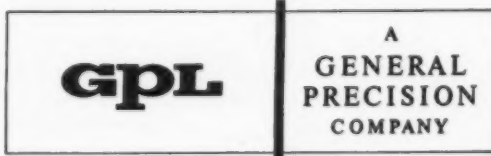
GPL's 2000th Doppler air navigation system is just off the production line. This milestone system, a RADAN® 500 navigator, is GPL's recent lightweight entry in the field of transport aviation equipment.

In 1948, when GPL flew the world's *first* experimental Doppler system, a revolution in air navigation began. This historic flight ushered in a new era of precision in the air—over the poles, over the oceans, good weather or bad, at sub or supersonic speeds—with navigational accuracies often *50 times* better than the best of previous techniques.

The revolution at GPL has never ceased. The first system of 389 pounds has evolved into the 2000th system of just 68 pounds. The 20 cubic feet of that initial Doppler have shrunk to the 1.6 cubic feet of the RADAN 500. And yet, the remarkable accuracies, reliability and performance of the original equipment have been improved.

The 2000th Doppler is the fourth "generation" of equipment in a program of continuous product improvement. It is the result of GPL creative electronics and the gratifying confidence of the U.S. Air Force, U.S. Navy, airline and corporate aircraft customers.

● J. W. Murray, chairman of parent General Precision Equipment Corp., congratulates R. W. Lee, GPL president. GPL vice presidents W. J. Tull and W. P. Hilliard participate in the ceremony.



GENERAL PRECISION LABORATORY INCORPORATED, Pleasantville, N. Y.
A Subsidiary of General Precision Equipment Corporation.

UAL School Welcomes Business Crews

United Air Lines, one of the best when it comes to pilot training facilities, has found a way to hike the utilization of its specialized equipment.

Its answer is a series of classes made available to a limited number of business pilots. Openings in regular UAL

courses are offered to subscribing executive pilots and include weather radar, meteorology, flight simulator time, Link training and actual flight training. J. G. Brown, Director of Flight Training, heads the program.

UAL also offers a correspondence

course in meteorology—20 lessons and a final exam. It covers weather from A to Z, even jetstream flying, and sells for \$150 per student.

Fleet operators can purchase training aids for weather radar instruction on an outright basis if desired. United has prepared a duplication of its student-pilot study for sale at a cost of \$4,050, compared to \$75 per student for a full-day course at the United school in Denver.

Flight simulator training is offered for the Convair 340 or Douglas DC-6, and by special arrangement, for the DC-8. United has one of the best simulator installations in the country and is completely equipped to reproduce emergency procedures, proficiency checks, and transitional training.

Simulator time is usually broken into two-hour periods, each preceded by a briefing and followed up by a critique from the instructor. Cost of the training is \$130 per crew-hour in the Convair simulator and \$150 per crew-hour in the DC-6B. The price applies only to time spent in the simulator.

Link training is conducted in modernized units and includes ADF, ILS and OMNI procedures. Charge for the Links is \$10.60 per hour. Link trainers are located in Chicago, Seattle, San Francisco and Los Angeles as well as Denver.

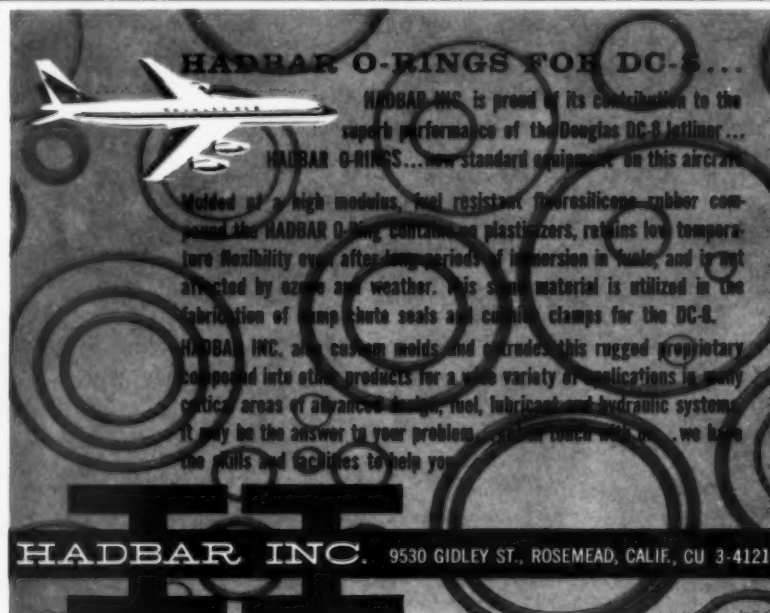


"Thank you, Mister Douglas."*

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HADBAR O-RINGS FOR DC-8...

HADBAR INC. is proud of its contribution to the superb performance of the Douglas DC-8 Jetliner... HADBAR O-RINGS... standard equipment on this aircraft.

Molded of a high modulus, fuel resistant fluorene-silicone rubber compound the HADBAR O-Ring contains no plasticizers, retains low temperature flexibility even after long periods of immersion in fuel, and is not affected by ozone and weather. This same material is utilized in the fabrication of pump-chute seals and cushion clamps for the DC-8.

HADBAR INC. also custom molds and extrudes this rugged proprietary compound into other products for a wide variety of applications in many critical areas of advanced design, fuel, lubricant and hydraulic systems. It may be the answer to your problem... contact with us... we have the skills and facilities to help you.

HADBAR INC. 9530 GIDLEY ST., ROSEMEAD, CALIF., CU 3-4121

Boxscore of UAL Contract Training

1958

Type	Organizations	Trainees
C Band Radar	48	139
Convair 340	5	80
DC-6	6	20

(Convair 340: FAA, Gov. of Indonesia, IBM, USAF, Union Producing Co.).

(DC-6: Arabian American Oil Co., Continental Airlines, TWA).

1959 (first 6 months)

Type	Organizations	Trainees
C Band Radar	53	201
Convair 340	9	122
DC-6	3	11
DC-8	2	53

(Convair 340: Arabian American Oil Co., McDonnell Aircraft Corp., Yugoslav Airlines, FAA, Frontier Airlines, National Cash Register Co., USAF, General Electric Co., Government of Italy).

(DC-6: Arabian American Oil Co., Yugoslav Airlines, Alaska Airlines).

(DC-8: Delta Air Lines, Japan Air Lines).

United's ground school courses cover such fields as use of the Jeppesen R-2 computer, Convair 340 and DC-6/7 performance and systems, and power-plant courses for the Convair and DC-6/7.

Ground school is conducted on a four-hour-per-day basis when dependent on other training, or on a six-hour-per-day basis if taken independently of other courses. Minimum charge is \$2 per classroom hour for each student.

Flight training in United's airplanes is arranged on a special space-available proposition. UAL carefully considers the need of the customer for the service.

Currently, five corporations, FAA, one airframe manufacturer, the Air Force and five airlines are enrolling crews at United.

New, Small Turboprop for Business Aircraft

Canadian Pratt & Whitney has taken the wraps off a new 500-hp free turbine engine that can be used as a turboprop for small business aircraft or a turboshaft engine for helicopters.

Designated the PT6, it weighs 250 lbs. and will carry a guaranteed maximum specific fuel consumption of 0.69 lbs. per eshp.

According to P&W officials, studies on the PT6 started only a year ago (in October 1958) and detailed design did not get underway until early this year. Development testing is already underway and the company is offering prototype flight engines in 1961.

The speed of PT6 development parallels that of another P&W project, the JT12 small jet, in which Canadian P&W participated along with Pratt & Whitney Aircraft Division of United Aircraft Corp.

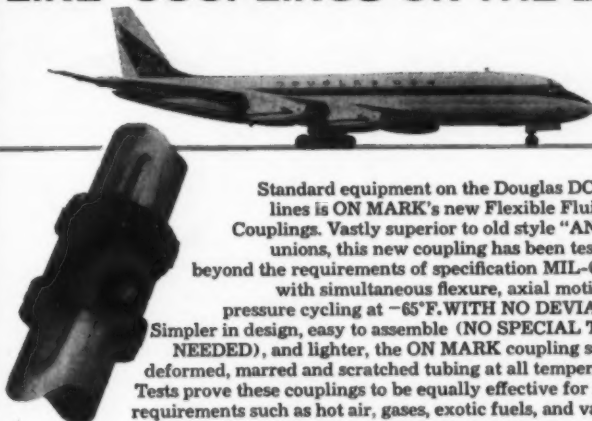
Design of the PT6 stresses ease of maintenance and P&W engineers anticipate a minimum servicing between overhauls of 1,000 hrs. The engine design steers clear of the complexity of concentric shafting. A single compressor assembly turns the first turbine and the second (free) turbine is driven by gas flow from the first. Reduction gearing linked to the free turbine provides 6,000 output shaft rpm for turboshaft versions and a second reduction gear stage produces 2,400 propeller rpm.



P&W's 250-lb. PT6 turboprop.

ON MARK COUPLINGS

NEW ON MARK FLEXIBLE LINE COUPLINGS ON THE DC-8



Standard equipment on the Douglas DC-8 fuel lines is ON MARK's new Flexible Fluid Line Couplings. Vastly superior to old style "AN" tube unions, this new coupling has been tested far beyond the requirements of specification MIL-C-25014 with simultaneous flexure, axial motion and pressure cycling at -65°F. WITH NO DEVIATION. Simpler in design, easy to assemble (NO SPECIAL TOOLS NEEDED), and lighter, the ON MARK coupling seals on deformed, marred and scratched tubing at all temperatures. Tests prove these couplings to be equally effective for special requirements such as hot air, gases, exotic fuels, and vacuum.

In production in standard tubing sizes.

For full information please contact

ON MARK COUPLINGS, INC.

4440 York Boulevard, Los Angeles 41, California

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Representatives: Airsupply Company, Beverly Hills, Calif.; Aero Engineering Company, Mineola, Long Island, N.Y.; Divisions of The Garrett Corporation;



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GROUND SUPPORT EQUIPMENT



ESCAPE CAPSULES



Thompson Aircraft Tire Corporation
treats on the following important subject...

How Many Times Can Jetliner Tires Be Retreaded?

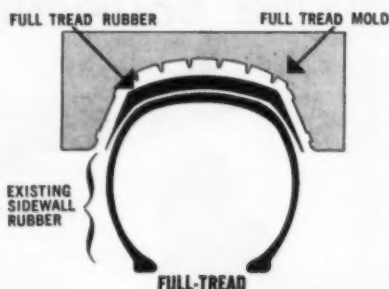
This pertinent question arises constantly in the airline industry and understandably so. Each successive retreading of the same casing represents substantial savings over the purchase of a new tire. Through the years and on ever-increasing fleets of jetliners, retreading savings can run into hundreds of thousands or millions of dollars. We, at Thompson Aircraft Tire Corporation, are being asked repeatedly our professional opinion on multiple retreading and shall attempt to provide it here as briefly as possible.

In principle, there is no theoretical limitation to the number of times a tire can be safely retreaded provided the casing remains in serviceable condition. The casing is always the determining factor. However, there are important things that can be done in the retreading and repairing processes that actually lengthen the service life of a casing! The techniques required are not simple, but through substantial, continuing investment in research and special machinery, Thompson has developed the technological means and retreading capability to lengthen substantially the casing life of jet tires.

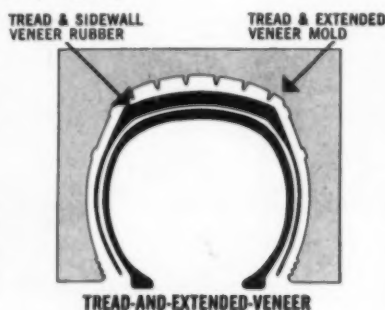
There are several conditions which can make a worn casing unsuitable for retreading and further flying service unless overcome by proper repair. These conditions are: (1) exterior sidewall rubber cracking, (2) casing cuts, holes and other injuries, (3) exposed cords in casing due to skids and excessive wear, (4) tubeless inner liner cracks, blisters, separations and other damage.

A common cause of casing deterioration is sidewall rubber cracking and checking. This is the profusion of small cracks that appear in the sidewalls from age, moisture, oxidation, flex, heat and ozone that expose the inner cord body to eventual deterioration. This can be corrected by replacing sidewall rubber with either Full-Tread or Tread-and-Extended-Veneer.

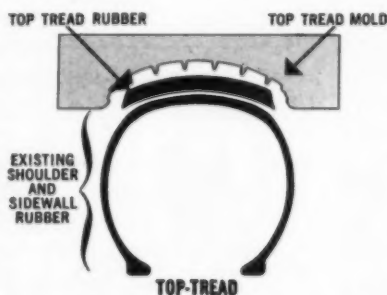
Full-Tread consists of replacing the rubber on the tread area, over the shoulder and down the sidewall approximately midway to the bead.



Tread-and-Extended-Veneer consists of replacing the tread area and up to all of the sidewall rubber from bead to bead. Since more rubber is involved in full-tread and tread-and-extended-veneer than for top-tread only, a slightly higher price has been established over top-tread prices. These slightly higher prices are very small considering that the application of either of these type treads extends the life of tires that would require rejection in any shop that could only top-cap.

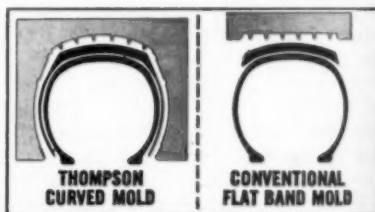


Top-Tread is available in those instances when retreading just the tread area suffices.



Thompson is expert in all three types of retreading... Full-Tread, Tread-and-Extended-Veneer or Top-Tread... and can apply the proper type, in each particular instance, that best preserves your

casings for longer, more economical service. It is recommended that the decision as to Full-Tread, Tread-and-Extended-Veneer or Top-Tread be based on expert examination of each casing and that the responsibility for decision be delegated to Thompson. The specialized molds Thompson maintains for the three types of retreading have a fundamentally important characteristic in common... mold shapes conform to the distinctive, curved profile of airplane tires and permit relaxed positioning and curing of the casing. This compares with the inevitable spreading and distortion of the casing that occurs when airplane tires are forced into the reduced diameter of flat-profile type retread equipment designed essentially for vehicular tires and used occasionally in bargain retreading.



Curved-mold Thompson retreads are not subject to radial and circumferential stresses that induce tread separation when a tire is improperly compressed or stretched during retreading. Thompson contour-shaped molds also eliminate possible damage to the air-tight seal of tubeless tires caused when the casing is forced into an off-shaped mold which was not specifically designed to maintain the original shape and contour of the tire when new. Unlike molds designed primarily to manufacture new tires, Thompson molds are designed expressly for retreading aircraft tires and do not require pre-shrinking distortion of casings before retreading.

The ability to repair a damaged casing is a second major factor in the preservation of a casing. Operating at high speeds under high air pressure and with limited skid depths and less cut-resistant material, all jet tires are inherently more susceptible to cutting from foreign objects and flat spotting than are conventional tires. Most such common damage

can be repaired by Thompson, and casings need not be scrapped. Based on extensive research of the physical and chemical properties of rubber as they apply to conditions of jet tire operation, Thompson has developed elaborate formulations and techniques for repairing damage while maintaining maximum safety factors.

Thompson determines the exact size and depth of casing damage in order to select proper rubber repair materials and establish the appropriate time, temperature and pressure for curing. Thompson has established specifications for reinforcement repairs when cuts extend into the ply. Reinforcements are a series of overlapping reinforcing plies installed on the inner side of the casing to re-establish the original tire strength factor.

Possible damage or cracks in the inner liner of tubeless tires is located by exact inspection, and repairs are made to maintain air impermeability and extend life of casing.

Bearing out the practical advantages to be gained from Thompson retreading, it is noted that the Boeing 707s on Pan-American World Airways trans-Atlantic flights are now operating on tires retreaded for the fifth time by Thompson.



THOMPSON JET-TRED ON BOEING 707

The Thompson techniques and specialized equipment described briefly above represent the sum total of 15 years of product development and provide the airlines with facilities unique in the retreading industry. Thompson is the one dependable source qualified to meet every retreading and repairing requirement with a reliable product realistically priced. Let Thompson determine the number of times your jetliner tires can be retreaded.

JET-TRED
BY
THOMPSON
AIRCRAFT TIRE CORPORATION

160 Bacon Street, South San Francisco, Calif.
International Airport, Miami 48, Florida
550 Ray Street, Freeport, New York

OCTOBER, 1959

ABOUT PEOPLE

Major changes at American Airlines include election of **William B. Whitacre** as v.p.-flight and **Walter W. Braznell** as assistant v.p. of the department. A technical services division was established within the operations department and is headed by **F. C. Wiser** as v.p. The division includes the jet maintenance and engineering center at Tulsa, and the purchasing and stores department. Wiser formerly was v.p.-operations; a successor has not been named. **G. J. Brandewiede**, who has been v.p.-purchasing and stores, resigned as an officer and said he will retire at yearend. Whitacre, former regional operations officer in Chicago, replaces **T. L. Boyd**, resigned. Braznell was director of flying operations.



WHITACRE



WISER

Warren E. Kraemer named chief executive in charge of the sales department and assistant to the president of Scandinavian Airlines System. The latter appointment is temporary. Kraemer has been senior v.p.-traffic and sales of SAS Inc., the airline's North American organization. **Karl A. Kristiansen**, who was chief of SAS' passenger sales division, named acting general sales manager. The two appointments followed the naming of **Hans-Erik Hansen**, former general sales manager, as executive manager of Thai Airways International.

John Barch, assistant to the senior v.p.-sales of TWA, elected v.p.-industry sales, and will represent the company from a sales standpoint in IATA, ATC and similar groups. **Tom Trone**, TWA's military airlift administrator, appointed director of sales development for Atlantic region.

Jack M. Brown, operations director of Aloha Airlines, elected v.p.-operations.



EBERT



GRIGGS

Robert A. Ebert, 16-year veteran with Northwest Airlines, named director of personnel and labor relations. **Benjamin G. Griggs Jr.**, budget analyst, appointed to new post of director of organizational control of NWA.

J. B. Shaver, Orient sales manager for Canadian Pacific Airlines, named assistant to the v.p.-traffic.

MAC

FOR AVIATION PRODUCTS IN THE MID-WEST

Now serving the Mid-west... Mid/Continent Airmotive Corporation's branches in Chicago, Kansas City and Denver offer prompt delivery of the finest in aviation products.

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FIRST 5 PLACE WINNERS IN
POWDER PUFF DERBY
ALL OF WHOM USED



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MAC is the authorized distributor for:

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ABOUT PEOPLE

Rear Adm. George Dufek, Navy's recently-retired Antarctic expert, retained as a consultant by Pan American World Airways. Initially he will go on a speaking tour in the South Pacific area.

Newly-elected directors of Alaska Airlines are **Richard W. Gilbert**, senior v.p., and **Henry Margolis**, eastern industrialist. **William A. Nelson**, formerly in United's regulatory proceedings department, named director of legal and public affairs of Frontier Airlines.

New TWA sales staff appointments: **J. J. Meade**, system manager of passenger sales; **David E. Midgley**, system manager of agency and tour sales; **Jack F. Forsyth**, manager of sales training.

B. B. Grimes, Braniff construction engineer, named superintendent of facilities engineering. **Dorothy Macdonald** appointed chief hostess for the Braniff system.

John F. Mano, REAL's U.S. sales manager, named general manager for traffic and sales in the U.S. for the Brazilian line. He is headquartered in Miami.

Jim Dodson, whose bush operation was acquired some years ago by Northern Consolidated Airlines, joined the company as assistant to president Ray Petersen.

AMONG THE SUPPLIERS

New appointments: **Jerome I. Davis** named v.p. of aircraft equipment division, Consolidated Diesel Electric Corp. . . .

William B. Rieke, assistant general manager, Lockheed Georgia Division; **Robert I. Mitchell**, director of sales; **T. R. May**, sales manager . . . **Carroll Stoecker**, assistant manager, Aero Engineering Division, The Garrett Corp. . . .

Henry C. Marquardt, manager of L. B. Smith Aircraft's manufacturing division . . . **William A. Barley**, assistant service sales manager, Southwest Airmotive . . .

Charles H. Jones, customer relations director, Sierracin Corp. . . . **Donald G. Richards**, chief engineer, Hamilton Standard Div. of United Aircraft Corp. . . .

IN THE AGENCIES

James L. Anast, who resigned recently as president of Lear Inc., returned to FAA as director of the bureau of research and development. Until last summer he was technical director of the former Airways Modernization Board, which became FAA's R&D bureau.

MacIntyre Heads EAL

Malcolm A. MacIntyre, former Under Secretary of the U.S. Air Force, takes over Oct. 1 as president, chief executive officer and a director of Eastern Air Lines (AIRLIFT, September). **Thomas F. Armstrong**, president since 1953, becomes executive v.p., concentrating on fiscal affairs. Board chairman **E. V. Rickenbacker**, who has been chief executive officer, heads a new seven-man executive committee, which includes MacIntyre, Armstrong and four directors, that will deal with major policy and planning matters. Initially, Rickenbacker also chairs the operations committee, which includes executive heads of all EAL departments.



By ANTHONY VANDYK

• **An Irish stew**—When two Americans living in Switzerland sell an Irish DC-3 to a British company, this is a really international operation.

Tom Lockwood and Roy Briten have their own company. They buy and sell aircraft and spares and operate an air charter exchange. They have handled just about every sort of aviation transaction that comes to mind, but the DC-3 deal, which ought to have been one of the simplest, was a nightmare.

It seems that the British certification authority, the Air Registration Board, has different requirements for DC-3s than have the Irish. To equip the aircraft involved, an ex-Aer Lingus plane, for British registration Lockwood and Briten had to pay out some \$9,000, much of it for special fire protection required for U.K. registry.

Talking with British and FAA authorities, Roy Briten came up with some fantastic findings on registry changes for U.S.-built aircraft. Supposing someone in Britain wants to lease a U.S.-registered transport. If it goes on the United Kingdom registry it must be altered to incorporate all ARB-required modifications. Then British import duty has to be paid, and all crew who fly it must have passed British pilot tests.

If it remains on the U.S. registry it can be flown by any pilot but—and it's a big but—all maintenance facilities need complex FAA approval.

Then there's the question of gross weights. A DC-3 on the British registry can take off at 28,000 lbs. but the U.S. maximum is 26,900 lbs. It would therefore seem to pay to have a DC-3 on the British registry. But in light of the experience of Lockwood and Briten, maybe it doesn't.

• **Cars across the channel**—Up and up goes the number of cars flown between England and Continental Europe. Just on the routes between England and Northern France, Silver City Airways in the first six months of this year carried 17,917 accompanied cars. Some 3,000 more were transported by Air Charter.

Silver City and Air Charter are also moving new, unaccompanied cars. Almost every British automobile manufacturer now exports to France by air while leading French automobile firms use air transportation for all English exports, including fully and partly assembled cars and spares.

In the first six months of this year Silver City moved 3,186 new cars. Another British independent, BKS, has a regular contract with General Motors Vauxhall to fly a daily batch of cars from Luton to Northern Ireland. The nose-loading Bristol 170 is used.

• **Seven Seas goes Dutch**—Why have two U.S. nonscheduled airlines established their main offices in Europe? We recently visited the picturesque canal-banked building where Seven Seas Airlines is temporarily located in Amsterdam pending transfer to permanent offices at city's Schiphol airport.

Last month's *AIRLIFT* reported that Seven Seas' key officials were formerly with American International Airways, the first U.S. nonsched to locate in Europe. AIA itself was set up in early

1958 by ex-Slick employes. Its main offices are at Melsbroek Airport, Brussels, although legally, of course, its head office is in the U.S. AIA has five DC-4s and engages in world-wide passenger and cargo operations.

Why did Seven Seas locate in Europe? The airline felt that many European contracts would be difficult to acquire long-range from the U.S. Many European charterers have a preference for aircraft operated and maintained to U.S. FAA standards but won't deadhead them across the Atlantic or go after loads to pay for such positioning flights.

Seven Seas also hopes to get contracts to perform jobs that other airlines are not permitted to do. For example, KLM cannot handle traffic for Indonesia because Dutch aircraft are not allowed to land there. Seven Seas, a U.S. carrier, can. Seven Seas could also perform flights for El Al Israel Airlines over Arab territories.

Why did Seven Seas choose Amsterdam? Because the airline considers that the Netherlands is the hub of European commerce and appreciates the very liberal policy of the Dutch toward foreign carriers.

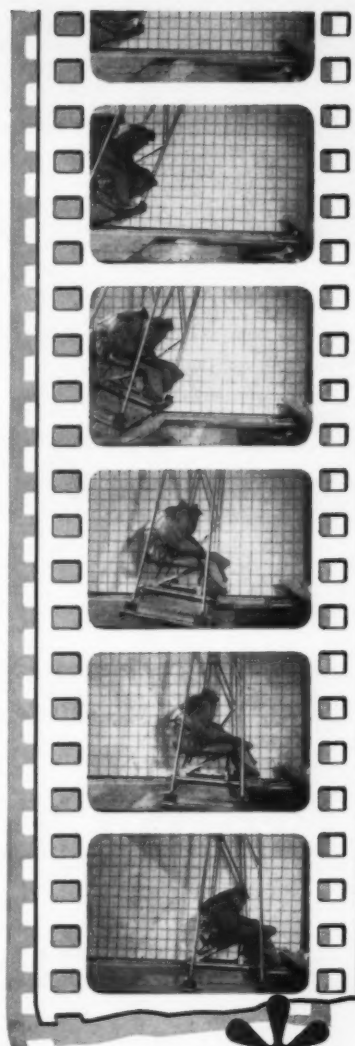
• **New knots in British air ties**—Ties between several British Commonwealth airlines are being strengthened. BOAC and TCA are negotiating a North Atlantic partnership route similar to those between BOAC and Qantas for the London-Australia route and between BOAC and South African Airways for the London Johannesburg route.

A similar arrangement likely will be concluded shortly between BOAC and Air-India International. These partnership agreements notably provide for revenue and schedule pooling.

While negotiating his airline's agreement with BOAC, TCA president Gordon R. McGregor noted that "the airlines, like every other form of transportation, have found . . . uncontrolled competition . . . an extremely expensive luxury which eventually must be paid for by either the passengers, the governments concerned, or both." He commented that "under the circumstances it is not surprising that pooling is being resorted to as a means of survival, and at this stage it is difficult to say where the current trend will lead. He doubted that anything along the lines of a British Commonwealth Air Union can be achieved "either quickly or easily."

• **Heavy hauling MATS**—If you really want to know what air cargo is all about go to the USAF's base at Chateauroux in Central France. Here MATS handles some six million tons of freight a month including 600,000 pounds of mail. About a quarter of this comes from the U.S. Another quarter is intra-European shipments inbound to Chateauroux.

About one million pounds goes to the U.S. The balance is represented by intra-European freight outbound from Chateauroux. MATS C-124s, C-118s and C-133s carry most of the transatlantic loads while within Europe the USAF's C-130s and C-119s are workhorses. About 250 cargo aircraft movements are involved monthly.



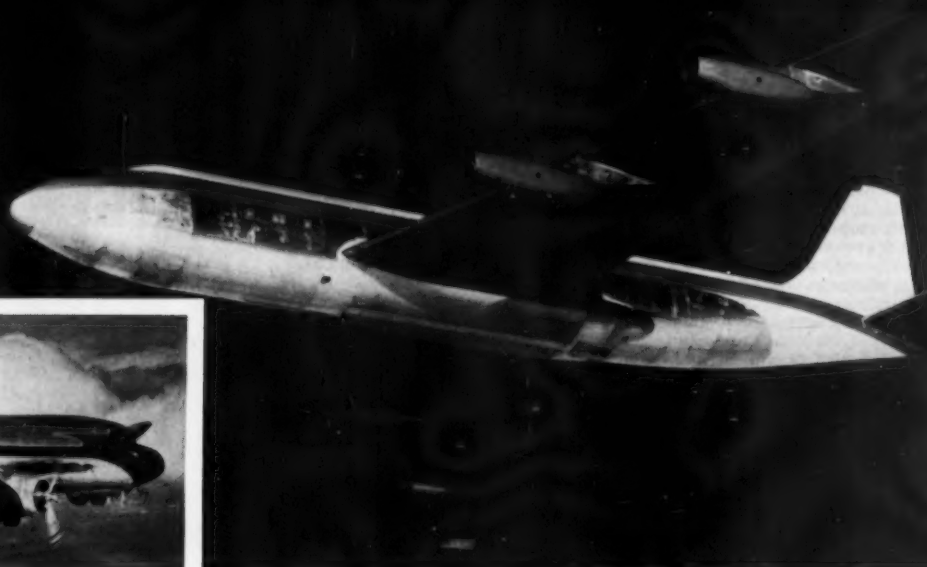
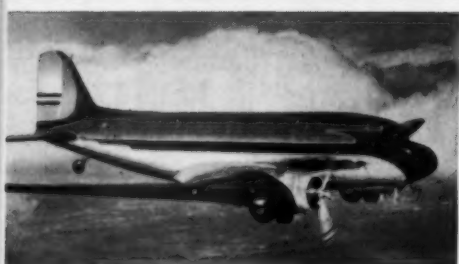
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"... from heyday of the DC-3 to grand entry of the supersonic fighter and commercial jet..."

IGNITION:

From Quarter-Mach ...to Mach-Plus !

by E. DEAN PRICHARD
Associate Member, Aviation Writers Association

*Changing
aviation needs
spark new series
of Champion Ignition
Conferences beginning
early next year*

For 14 years—from heyday of the DC-3 to grand entry of the supersonic fighter and commercial jet—some of the best brains in aviation have met annually in Toledo, O., to swap competitive know-how gained from thousands upon thousands of man- and engine-hours' experience. Top engineers, crack mechanics, aircraft engine and

parts manufacturers, pilots, research technicians, nationally acclaimed Champion ignition experts. Locked in honest give-and-take, no problem too weighty or too insignificant to warrant attention, no holds barred in analysis and evaluation of aircraft engine components and operation.

These were the annual Airline Ignition Conferences staged by Champion Spark Plug Company—unique, free exchanges of information and ideas evolving from research as well as field experience. Symposiums unique in the aviation industry, unique in American industry; devoid of commercial "pitch," competitive interests united by a common goal: *Improved powerplant performance.*

Results are a matter of record. The Airline Ignition Conferences proved invaluable as commercial aviation "climbed-out" through the myriad complexities of advancing power from DC-3 status to DC-7 and Super Connie stature. Not only did the conferences aid in daily airline operation and maintenance, but new plugs were developed expressly to *make possible* the power zenith newer, bigger reciprocating engines were designed for and were trying to achieve.

Now—with the airline reciprocating-engine age at peak-power maturity and the needs of aviation changing—Champion is moving into a new era of conferences: annual *Business Aircraft Ignition Conferences* and plans for *Airline Jet Igniter Conferences*. Champion is "in recess" this Fall, usual conference time, working out details for a first annual business-flying conference soon after Christmas.

"We've all come a long way, solved a lot of problems," said R. L. (Doc) Anderson, one of the

early Conference Chairmen and now Champion Aviation Service Manager. "Champion is deeply, genuinely grateful to all the men of the nation's airlines whose co-operation made this possible. We know you, as we, have benefited immeasurably.

"Now the priceless technical know-how of lab and field experience published in Champion's 14 airline conference reports will become increasingly important in daily maintenance and operation of this nation's *business* and *private* fleets—as they assume the dominant role in reciprocating-engine aviation. And this wealth of airline data will provide the very foundation for successful Business Aircraft Conferences—as well as a standard for developing Airline Jet Igniter Conferences."

The national Business Aircraft

Conferences actually will supplement the work of Champion field representatives, who for years have been passing along airline conference benefits to business and private flying through district clinics. And the Airline Jet Igniter Conferences would supplement Champion's field work with the airlines on igniter performance.

Champion jet igniter know-how comes from having pioneered igniter development: Champion assisted in development of experimental military jet engines in 1942, has since joined forces with many jet engine manufacturers . . . and, as with spark plugs, remains in the forefront today in jet igniter development, producing more than any other manufacturer.

Complementing 14 years of Airline Ignition Conferences, engi-

neering of improved spark plugs as well as igniters continues in Champion's new million-dollar Engineering-Research facility, adjacent the main plant at Toledo. From this background has just come, for example, Champion's new self-cleaning *Foul-Resistant* plug, much in demand since introduction several weeks ago. Many hands were involved in the development of this revolutionary plug—the answer to one problem (lead/carbon fouling) often aired at Ignition Conferences.

Champion is looking forward to the invaluable mutual benefits and achievements bound to result from future Business Aircraft and Airline Jet Conferences.

CHAMPION SPARK PLUG COMPANY
TOLEDO 1, OHIO

International Airline Representatives chat at conference: (L/R) Duane Stranahan, Champion Vice Pres.; Carl Schonfeld, KLM; Luciano Perani, Alitalia; Octavio Garcia, Avianca; Lucien Roy, Gilbert Goria, Air France; Roelof Brinks, KLM; R. A. Stranahan, Jr., Champion Pres.

Airline representatives conduct conference in the interests of improved powerplant performance.



Champion Salutes 34 Ignition Conference Chairmen:

R. L. Anderson	—C&S	N. R. Parmet	—TWA	H. F. Osteen	—NAL
E. P. Kovac	—AAL; LASI	H. C. Archer	—NAL	Vernon L. Dodd	—NEA
C. E. Swanson	—NWA	Burke Starks	—C&S	A. A. Weigand	—EAL
A. M. Weber	—TCA	M. C. Fillmore	—SABENA	C. C. Mitchell	—AA
R. W. Farren	—TCA	A. B. Holmer	—SAS	H. M. Ingalls	—CAP
L. P. Larson	—NWA	J. M. Sorensen	—NWA	George Roycraft	—NOR
F. W. Lochner	—EAL	W. H. Wijnholds	—KLM	Dean Miller	—DAL
L. J. Krentz	—UAL	Earl J. Horrell	—CAL	J. A. Mitchell	—TCA
Arthur Kuhn	—PAA	C. A. Fisher	—TWA	R. C. Posz	—NWA
N. K. Davis	—UAL	T. R. Preitkis	—UAL	W. F. Davis	—PAI
J. E. Lindberg	—PAA-PAD	D. W. Crosby	—EAL	Duane Stranahan	—CSPC
		W. J. Kressek	—TWA		

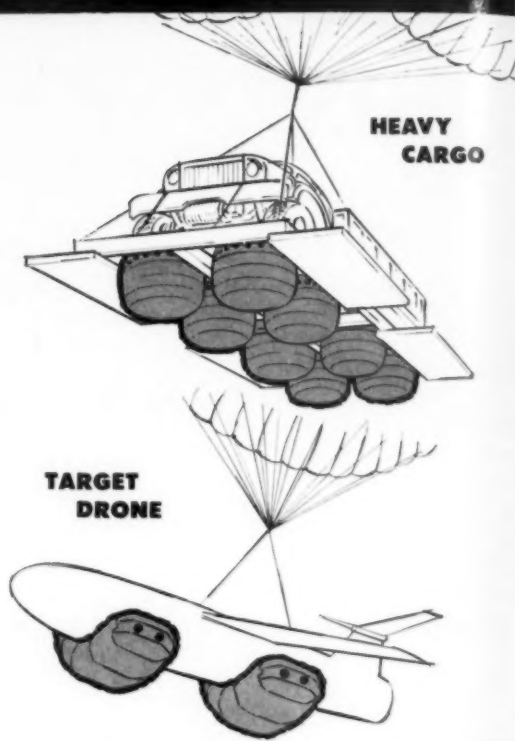
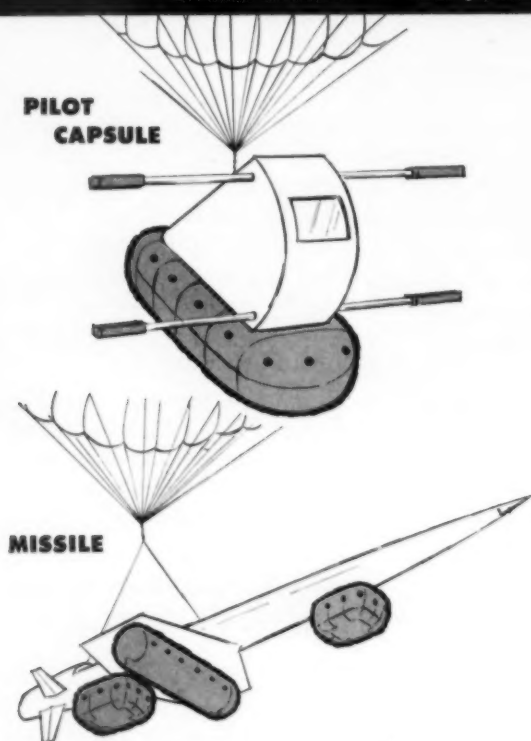
Note: Affiliation listed is at time of chairmanship.

Priceless technical know-how of world's leading airlines and spark plug manufacturer is compiled in 14 Conference Reports examined by R. L. (Doc) Anderson, Champion Aviation Service Mgr. This pooled competitive know-how, which helped move airlines into reciprocating-engine maturity and jet age, will further benefit business flying as Champion supplements regular district clinics with annual Business Aircraft Conferences, beginning next year.



PNEUMATIC RECOVERY SYSTEMS

another product of Air Cruisers research



Solve New Missile and Capsule Recovery Problems

Air Cruisers has nearly a decade of experience in the development, testing and production of pneumatic recovery systems. Beginning with aerial cargo recovery, the company expanded its activities to include deceleration systems for various missile and target drone applications.

Other Air Cruisers system designs include recovery of missile nose cones and component parts, and pilot capsule recovery which enables the crew to land safely in the sealed capsule.

Air Cruisers' recovery systems consist of inflatable deceleration and/or flotation bags specially designed to meet all requirements:

- Provide maximum protection from landing damage
- Insure uniform deceleration
- Limit maximum "G" loadings
- Insure complete protection at normal drift and oscillation attitudes
- Provide dependable and adequate buoyancy for water recovery

With these rugged impact bags, you may have your choice of inflation methods, including the proved jet pump method to save added weight and space. Air Cruisers starts with your problem statement and can furnish the complete system. Write for full information concerning pneumatic recovery systems.



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SALES TALK

AA, Braniff Use New Tickets for Cardholders

Write-your-own tickets for air travel plan subscribers are being introduced by American Airlines and Braniff Airways.

AA's "Aircheck," effective Oct. 15, and Braniff's "U-Write-Ticket," starting Nov. 1, will be valid for on-line transportation. The companies' Universal Air Travel Plan subscribers call for reservations, fill in the tickets and present them at the airport. Braniff's plan also applies to its on-line credit cardholders. AA is inviting other lines to accept Airchecks.

No-Reservations Service Planned by Allegheny

Allegheny Airlines is willing to knock almost 2½¢ a mile off your Pittsburgh-Philadelphia ticket if you'll take a chance on boarding without a reservation, and if you'll handle your own bag.

This 2½¢ a mile is what the airline figures it will save if it doesn't have to take reservations, issue tickets, handle bags, etc.

The stand-by commuter proposal is part of Allegheny's plan to offer three Pittsburgh-Philadelphia fares, effective Oct. 4. It will also adopt the Continental Air Lines system (AIRLIFT, June) and collect tickets aloft. A Convair 540 turboprop leased from Napier Engines will be used on the route. The fares:

Regular: \$18.45, or 6.86¢ a mile, totaling \$20.30 with tax. Passenger would have reservation, ticket, etc.

Ticket books: 10 tickets at 15% discount. Price, \$15.68 per ticket, or 5.8¢ a mile, totaling \$17.25 with tax. Passenger entitled to all ground services.

No reservations: \$11.82, or 4.39¢ a mile, totaling \$13 with tax. No ticket, no baggage handling (service would be furnished for 9¢ per lb., minimum of \$2).

Procedure for standby commuter: Obtain a card at the airport and write name on it, time-stamp it in a time-clock, turn it in to agent at gate. After ticketed passengers are boarded, commuters are taken in time order reflected on their cards.

FAL Serves Drinks

Alcoholic beverages are being sold by Frontier Airlines on Convair flights—the first time a local line has served anything stronger than beer. Bourbon, scotch, martinis and manhattans are available at \$1 each. During two months, 1,250 drinks were sold. FAL says revenues defray about half the cost of the new "snack trays" featured on Convairs.

TWA Makes Major Bid for Cargo Business

TWA is making the most determined bid in its history for cargo business.

International cargo flights jumped from one to four roundtrips weekly on Oct. 1. Instead of one domestic transcontinental roundtrip five days weekly, there are two daily plus another between the east coast and midwest. Available ton-miles in cargo planes alone now total 4,148,000 monthly overseas, 2,079,000 domestically.

Six Lockheed 1049H Constellations, used on MATS contract flights now concluded, were put in cargo service, together with two other 1049s.

REGULATORY

NWA Favored as Only Seattle-Hawaii Line

Northwest Airlines should be the only carrier between Seattle/Portland and Honolulu, CAB examiners F. D. Moran recommended.

Twice before, CAB selected NWA as the only operator, but the White

House on both occasions added Pan American, Moran noted, asserting that Hawaii is now a state and the CAB decision will not be subject to Presidential approval. Recommending a permanent certificate for NWA (present permits are temporary), he said operations by two lines have been conducted with "heavy losses," which he put at \$3,-366,000 for two years.

NYA Recommended for Unlimited Certificate

Recommendation that New York Airways' certificate be renewed for an unlimited period and that its operations not be restricted to rotary-wing aircraft was made by CAB examiner F. W. Brown.

Restriction on rotary-wing craft should be changed to a new designation limiting the carrier to "community center service" or "airport-to-airport" service, he said, recommending that NYA be extended to New Haven but that its request for an area certificate be denied.

Examiner Rules Against Hertz Car Rental Plan

Hertz Rent A Plane System is in violation of the Federal Aviation Act in the operation of its plane rental business, CAB examiner W. W. Bryan said.

The company is holding itself out as an indirect air carrier, and since it does not have a certificate or an exemption, it is violating the Act, he said in his initial decision. Asserting that Hertz should be ordered to cease and desist from further violation, Bryan added: "The license agreement between Hertz and its licensees severely restricts the freedom of the individual operator, and its contents make it clear that Hertz controls the operations . . ."

AA Gets SF Nonstop

American Airlines opens New York-San Francisco nonstop jet service Nov. 1 following formal CAB decision granting it the right. Decision was first announced by press release four months ago (AIRLIFT, June).

for removal of snow and ice on runways...

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The Ice Blades are attached to the truck frame between front and rear axles . . . completely reversible to right or left. Blade can be tilted to conform to pavement . . . all hydraulic power controlled from cab. Trucks also equipped with WAUSAU 3-Way Snow Plows.

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9 styles

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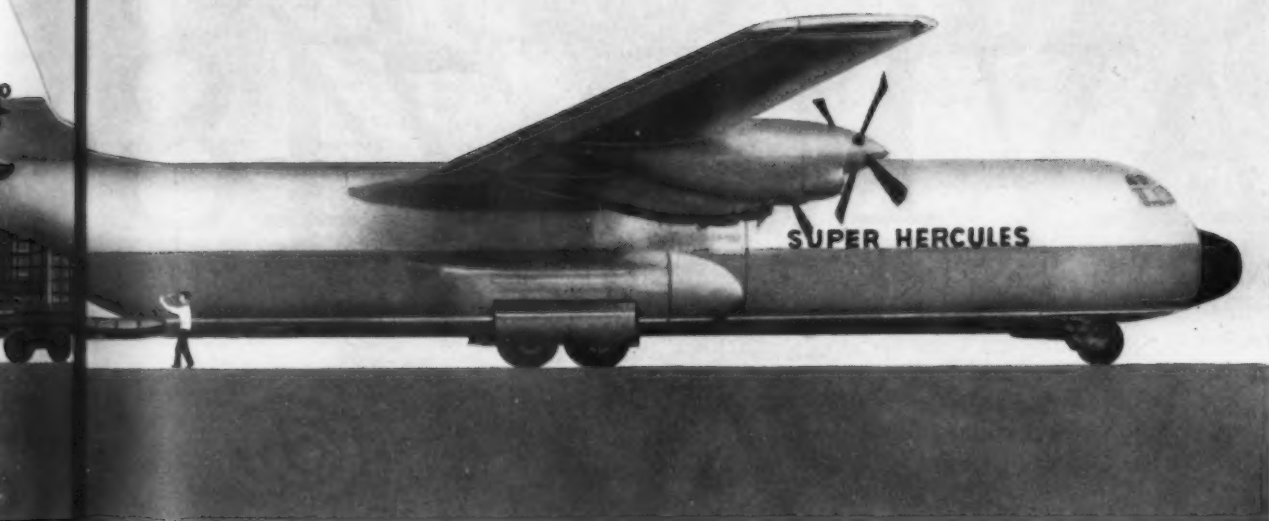
TRUCK GRADER ICE BLADE



Lockheed's new GL-207 SUPER HERCULES - First 3.5¢ per-ton-mile airfreighter



SUPER HERCULES non-stop flights: transcontinental, with full 77,000-pound payloads; transatlantic to European cities as far as 4,650 miles, with 60,000-pound cargoes; San Francisco to Tokyo, with 43,500 pounds.



Nine lightweight cargo pallets with 77,000-pound payload can be mechanically loaded in or unloaded from the SUPER HERCULES in less than one minute!

The long-sought goal of air freight carriers—cargo rates competitive with surface transportation—will be achieved when Lockheed's GL-207 SUPER HERCULES starts rolling off production lines in 1961.

In addition to a direct operating cost of 3.5¢ per-ton-mile, the SUPER HERCULES embodies these profit-making features: straight-in rear loading through huge 9' x 10' doors... truck-bed height cargo floor... dependable prop-jet power provides flexible operational altitude... pressurized and air conditioned cargo compartment, ideal for transporting perishables, animals, and sensitive cargo... short-field landings and takeoffs... climb rate of

1690 feet per minute... over the weather altitude capability... cruise speed of 390 miles per hour... transcontinental and transoceanic non-stop range.

Using Lockheed's Lightning Loader system, the SUPER HERCULES can unload its entire palletized cargo, reload, refuel and be ready for take-off—in less than 20 minutes!

Get the complete story on the profits to be made with the Lockheed GL-207 SUPER HERCULES—designed to haul the goods of the world in the Jet Age. Write or telephone: HERCULES Commercial Sales, Lockheed Aircraft Corporation, Georgia Division, Marietta, Georgia.

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NUCLEAR REACTOR DESIGN & DEVELOPMENT • GROUND SUPPORT EQUIPMENT • WORLD-WIDE AIRCRAFT MAINTENANCE

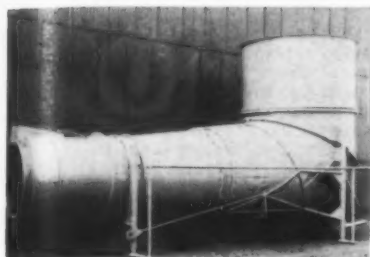
INDIA CHOOSES AVRO 748

The Indian Government has chosen the military version of the Avro 748 — Hawker Siddeley's new turboprop feeder-line aircraft — as replacement for the air force's Dakota fleet. The Avro 748 is the ideal aircraft with which civil and military operators can advantageously replace their existing piston-engined equipment on short to medium range routes.

HAWKER SIDDELEY AVIATION

32 Duke Street, St. James's, London, S.W.1.





Noise Suppressor

A jet engine noise suppressor with a claimed reduction of 31 db is being made by Air Logistics Corp., Pasadena, Calif. Using a diffusion principle to maximize performance versus weight, the Model 11020 is a cylinder. A 90 deg. bend houses a vertical exhaust stack.

The system has a maintenance free characteristic of more than 1,000 hrs. It is mobile, mounted on heavy duty casters. Hydraulic lifts accommodate engine center line heights of 42 to 108 inches.

Write Air Logistics Corp., 3600 E. Foothill Blvd., Pasadena, Calif.

Hydraulic Test Stand

A Universal Hydraulic Components Test Stand for simulated flight-condition testing of airframe hydraulic components is available from American Avitron, Mamaroneck, N. Y. The model 9510 is being

used to test 98 different components for the Electra and DC-8.

The stand has three hydraulic pumps and a nitrogen system for high-pressure static testing. Fluid temperatures are maintained at 160F, plus or minus 5F.

Instruments are shock mounted to prevent vibration distortion, and controls are conveniently located.

Write American Avitron, 514 Halstead Ave., Mamaroneck, New York.



Reversible Liferaft

A reversible liferaft which can be boarded from either side is made by the Beaufort Co. of Birkenhead, England. Contracts by Qantas and TEAL followed extensive tests in Australia.

The raft inflates automatically in 17 seconds. It can be boarded from either side, regardless of the way it lands in the water. It has a canopy to guard against

excessive occupant exposure—the chief cause of sea fatalities. The canopy is jet inflated and self-erecting.

The raft is available in several sizes up to a 26 seater. Double air chamber construction provides additional safety.

Write to Beaufort Company, Birkenhead, England.



Airplane Parker

A tiny, one-man-operated, low-cost airplane parker called the Ramp Rascal is

DOUGLAS selects

REGENT for Maintenance

The Regent Model 2955 Hydraulic Variable Height Aircraft jack, capable of lifting loads up to 50 tons, and the Regent Model 5182 Tire Bead Breaker, will speed DC-8 maintenance, increase in-flight utilization. Correctly designed and efficiently manufactured, Regent labor-saving maintenance aids are known for fine performance and long life.

Write for Free Bulletin

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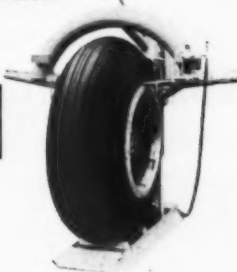
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3000 lb. capacity



another typical example of
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The Model 358-01 Crew Mask



The Model 289-01 Passenger Mask

Sierra®

personal emergency oxygen equipment*
for crew and passengers

Sierra, pioneer in customized personal oxygen equipment gear, provides this new and unique system for use on the United fleet of DC-8 Jet Mainliners — in case of emergency. Crew members are individually fitted with an oronasal mask easily attached to the breathing tube by means of a bayonet connector. For passengers there is an effective, universal fitting, oxygen breathing mask. Write for information and technical paper.

123 E. Montecito, Sierra Madre, California

* Sierra crew and passenger masks comply with FAA regulations



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Leading Manufacturers of Fabrics and Tapes for the Aircraft Industry

NEW PRODUCTS

being marketed by Permanent Filter Corp., Los Angeles.

Weighing only 89 lbs., the hand-operated unit is designed to fit most twin-engine airplanes. It operates with "feather touch" control, performs equally well on flat and inclined surfaces, and places no strain on nose wheel assemblies. It is powered by a 2-cycle, 3-phase gasoline engine and utilizes constant-friction rollers for smooth, steady motion.

Write Permanent Filter Corp., 1800 West Washington Blvd., Los Angeles, Calif.



Water Detector

A testing device that can detect minute traces of water in jet fuel has been designed by the Esso Research Center at Linden, N.J.

Called Hydrokit, the device finds application during final fueling stages, right at the airplane. By dissolving a powder into a specified sample of jet fuel and observing changes in color, the presence of water as minute as 30 parts per million can be detected.

The device is a final test on a series of control devices applied by Esso affiliates to prevent jet fuel water contamination.

Write Esso Export Corp., Aviation Dept., 60 West 49th Street, New York, N.Y.



Temperature Indicators

Kahn and Co.'s Thermi-Tran temperature indicators permit accurate temperature measurements even at remote locations with Thermistors, which are thermally sensitive resistors having high negative coefficients of resistance.

Thermistors can be placed at strategic

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locations throughout an aircraft, and can be coupled to the metering device by standard copper wire of any practical length, with no undesirable effect on accuracy, which is plus or minus 2% of full scale.

Thermi-Trans are available in single-channel portable form or in panel-mounted, multi-input models.

Write Kahn and Company, P.O. Box 516, Hartford, Conn.

Lightweight Hose

The Weatherhead Company, Cleveland, has developed lightweight fuel hose assemblies made of reinforced cotton and wire with a synthetic lining. The assemblies range from 1-in. to 4-in. diameter. The 2-in. size is said to weigh 23% less than standard assemblies, while the end fittings weigh 27% less.

They are resistant to fuel, hydraulic oil, alcohol, water and air and are designed for fuel, oil, gas, pneumatic and hydraulic applications.

Write The Weatherhead Co., 300 E. 131 St., Cleveland, Ohio.



Boom-Mike Headset

A Boom-Mike headset manufactured by Telex, Inc., St. Paul, Minn. is the first such unit to win FAA acceptance. Weighing only 3½ oz., the headset is designed for flyers, ham and mobile two-way communications, radio and television technicians, telephone operators, receptionists and dispatchers. The standard model contains a dynamic mike, but carbon, reluctant and crystal mikes are also available.

The receiver has a rising response characteristic for maximum voice intelligibility. It is a standard item on Pan American's 707 European service.

Write Telex, Inc., 1633 Eustis St., St. Paul, Minn.

Taxi Radar

Ground traffic problems at airports may be lessened by a taxi radar system developed by Cutler-Hammer's Akron Airborne Instruments Lab. Called Airport Surface Detection Equipment, the high-resolution screen will show all aircraft, ground vehicles and buildings within a four-mile range of the tower.

Both FAA and the USAF have ordered units for installation at fields where ground traffic is heavy.

Write Airborne Instruments Laboratory, Cutler-Hammer, Inc., 315 N. 12th Street, Milwaukee, Wis.

S MON 7453 CONGRATULATIONS TO DOUGLAS AIRCRAFT COMPANY, THE PIONEERS OF TRANSPORT AIRCRAFT, ON THEIR GREAT ACHIEVEMENT....THE DC-8....AND TO THE MANY AIRLINES WHO WILL BE OPERATING THIS SUPERB AIRCRAFT....FROM CEE BEE CHEMICAL COMPANY....PIONEERS OF AIRCRAFT CORROSION CONTROL, GUARANTEED FUEL TANK REPAIR, AND THE MOST SIMPLIFIED AND ECONOMICAL PROCESS FOR CLEANING JET ENGINES. C. D. BLACK, PRESIDENT, CEEBEECHEM

NEW PRODUCTS



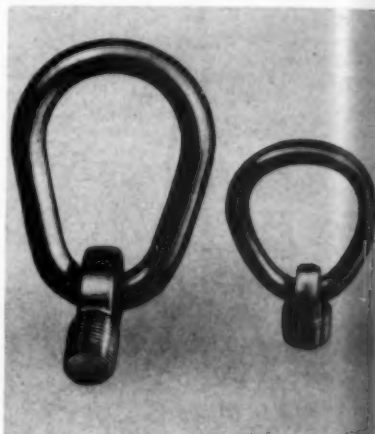
Oxygen Outlet Valve

Oxygen flow for emergency passenger masks on the DC-8 is controlled by a lightweight (.7 oz.), compact outlet valve made by Puritan Compressed Gas Corp., Kansas City, Mo.

The valve is made of molded nylon, and opens automatically when the mask is donned. It can be supplied with an accurately adjusted orifice which will regulate oxygen flow for maximum economy.

It is adaptable to a variety of aircraft oxygen installations.

Write: Puritan Compressed Gas Corp., Kansas City 8, Mo.



Tie-Down Rings

A line of low-cost, aircraft quality tie-down rings and floor fittings for a variety of fastening requirements is available from MAK Industries, Inc., New York City. The rings are manufactured to military specs for cargo handling applications. They are cadmium plated and magnetically inspected, and are available from stock in sizes from 2,000 to 50,000 lbs. capacity.

Write: MAK Industries, Inc., 1938 Park Ave., New York, N.Y.



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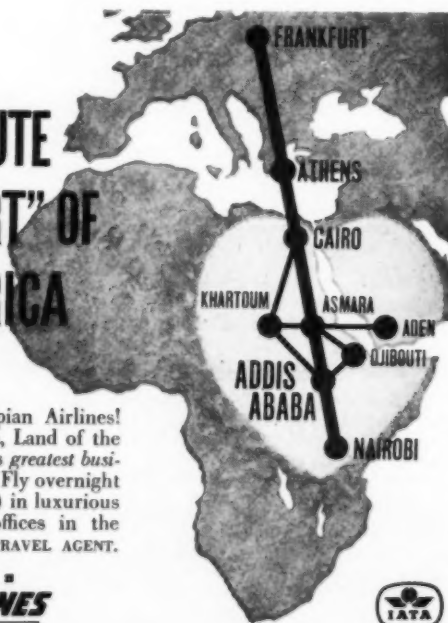


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INFO FOR THE ASKING

Passenger loading stand—Bulletin describing Model 2103 electric stand adjustable to 160 in. above ramp.

Write: Consolidated Deisel Electric Corp., Stamford, Conn.

Air fasteners—Manual describing two pneumatic fastener installation tools is available from Huck Mfg. Co., Detroit. Performance curves relate air pressure to pulling capacity for each tool.

Write: Huck Mfg. Co., 2480 Bellevue Ave., Detroit, Mich.

No-spill valves—Snap-Tite, Union City, Pa. has catalog describing "15 series" quick connect-quick disconnect valved couplings which are designed for "no-spill" service in airborne and ground hydraulic systems.

Write: Snap-Tite, Inc., Union City, Pa.

Molecular dryer—A booklet explaining water removal from jet fuel by Molecular Sieves is available from Linde Co., division of Union Carbide, N.Y. The booklet explains how Sieves adsorb molecules of water while rejecting large fuel molecules.

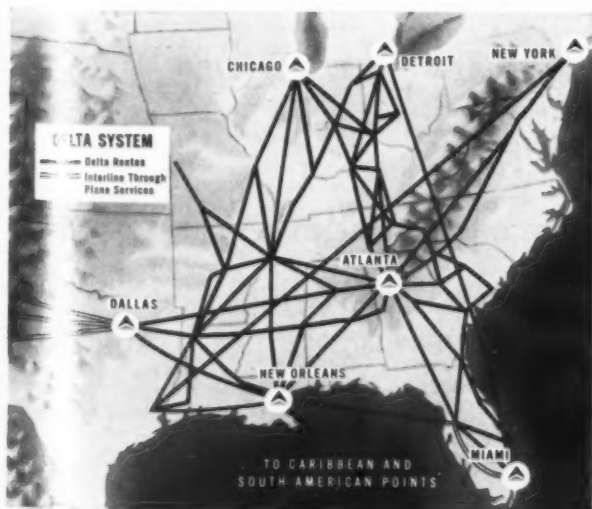
Write: New Products Dept., Linde Company, Division UCC, 30 East 42 St., New York, N.Y.

Pull 'em, start 'em—A brochure by Air Logistics Corp. examines the Pilot Bug, a multi-purpose aircraft support vehicle which tows aircraft, provides external power and has facilities for jet engine starting. The vehicle is said to save up



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Director of Personnel, Allegheny Airlines,
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Personnel Department
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P. O. BOX 391, LAS VEGAS, NEVADA

to 400 gallons of fuel per movement by
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Write Air Logistics Corp., 3600 E. Foothill Blvd.,
Pasadena, Calif.

Ketay catalog—From Ketay Dept.,
United's Norden Division, Commack,
L.I., N.Y., a list of 200 synchros, servo
motors, servo amplifiers, resolvers, rate
gyros and potentiometers. Catalog con-
tains specs and outline drawings on each
model.

Write Ketay Dept., Norden Division, United Air-
craft Corp., Commack, L.I., N.Y.

Go/no-go tester—A catalog of auto-
matic equipment for go/no-go testing of
electronic components is available from
Kearfott Co., Little Falls, N.J. Also avail-
able is a catalog listing R900 series
synchros.

Write Kearfott Co., Little Falls, N.J.

Clean 'em up—A handbook covering
metal cleaning on the industrial level
can be obtained from Oakite Products,
Inc., N.Y. Handbook explains modern
techniques of metal cleaning and sug-
gests methods appropriate to a variety
of cleaning requirements.

Write Oakite Products, Inc., 19 Rector St., New
York, N.Y.

Clean tool dept.—The use of Nialk
Trichloroethylene for vapor degreasing is
the subject of a booklet by Hooker
Chemical Co., Niagara Falls, N.Y. The
booklet covers aspects of shipment, stor-

age, and cleaning use of the chlorinated
organic solvent.

Write Hooker Chemical Corp., Box 344, Niagara
Falls, N.Y.

For your bookshelf

Transistors, A to Z—A fourth edition
of GE's Transistor Manual, priced at one
dollar, contains 227 pages of data on
transistor use in electronic circuits. Book-
let covers basic theory, transistor manu-
facturing techniques, design, and serv-
icing. Write: Semiconductor Products
Dept., Charles Bldg., Liverpool, New
York.

NOTES ABOUT SUPPLIERS

• Minnesota Airmotive, Inc., formerly a
subsidiary of F. H. Peavy & Co., has
been made a division of the Minneapolis
firm. The new division will continue to
operate sales and service facilities at
Wold Chamberlain Field, Minneapolis,
where its propeller overhaul facility and
general maintenance shop is located.

• The Atlantic Research Corp., of Alex-
andria, Va. has acquired the Prewitt Air-
craft Co. of Clifton, Pa. Prewitt has
been known particularly for development
of a high-lift helicopter blade which com-
bines metal with reinforced plastic.

• Arrangements to distribute American-

made Helio Courier STOL aircraft in
Scandinavia have been made by the Helio
Aircraft Corp. of Norwood, Mass. and
the SAAB Aircraft Co. of Sweden. Scan-
dinavian countries are particularly inter-
ested in STOL aircraft because of the
widespread lack of large airports.

• Boeing has awarded Weber Aircraft
Corp., Burbank, Calif., an additional con-
tract for 26 shipsets of lavatory compart-
ments. They are planned for American
Airlines' 720 airplanes, and are very
similar to units recently placed in Ameri-
can's 707s.

• Air-India International has contracted
with Lockheed Aircraft Service, Inc. to
convert three L-1049 Super-G Constella-
tions from passenger to convertible all-
cargo/passenger configurations. Air-India
is the first carrier to order the conversion.
It will permit use of the aircraft as a
freighter, high-density passenger airplane,
or combination of both.

• Sundstrand constant speed drives on
Boeing 707s have accumulated more than
138,000 flight hours. They are installed
on 38 707s in use by American, Con-
tinental, Pan American and TWA. A re-
liability of .99948 has permitted an over-
haul time increase from 800 to 1,200
hours.



Two Haircuts in Russia (Concluded)

Mountain Hopping Out of Russia . . . On to Afghanistan

At 7:20 in the morning there was a loud knock on the door of our hotel room in Tashkent. Our Intourist interpreter, Raya Smirnova, was waking us up to get us to dress fast. Our plane to Kabul, Afghanistan, was leaving unexpectedly at 8 a.m. instead of late in the morning.

Taking into account my hangover from the big scotch-vodka-wine-champagne-brandy party the night before, this was indeed a shocker. For a moment I wanted to stay in bed. Then I came to fast. We were already delayed one day due to a cancelled flight. Aeroflot flies only a couple of days a week to Kabul when the weather is good. I had had enough of Uzbekistan. In a rush I shaved in cold water and finished packing. My wife and I lugged our bags downstairs and out to the waiting Intourist car.

The big Intourist wheel for that area, the very nice Mr. Abramov, had also gotten word of the early departure and had rushed, complete with hangover, to escort us to the airport. We arrived there at 8:05, quite good if I do say so myself, but probably not the all-time record for hasty exits from the Soviet Union. There was no danger that the airplane would leave without us—not with Intourist in charge. I'll say this for Intourist—it takes awfully good and responsible care of its customers.

Tea and Flies

Matter of fact, our plane didn't leave until 8:45 a.m., but all Aeroflot schedules are improvisations and nobody seems to mind. So we had time for a cup of tea which, like most things in Central Asia, is always shared with a nice bounty of flies.

My wife and I thanked our Raya for a very excellent 19 days of guidance and

assistance. Let it be known to all and sundry that Raya is one of the most personable and competent interpreters with USSR and we would have liked to have taken her with us to India and beyond.

We boarded our Aeroflot twin-engine Il-14 on this magnificent, cloudless morning. There were just nine passengers, a few Afghans returning to Kabul from Europe via Moscow, and some Russians going out to do their stuff for the mother country and Soviet imperialism. We were the only westerners.

I need hardly add that this exit from the USSR had all the atmosphere of an adventure, which it was. We were leaving by the only port of entry available to Americans between Odessa in European Russia and—well, there just isn't any other. To the east are Red China and Outer Mongolia. It was sort of a little-used back-door route over very mountainous country to a little-known and little-visited country called Afghanistan.

Our plane headed southwest over the partially-irrigated desert. In less than an hour we skirted Samarkand with its old Moslem ruins and unpaved airstrip, then headed due south. In another hour we came to the border stop on the famed, historic Oxus River, a place called Termez, and came in for a bumpy landing on a tiny, dusty, unpaved field that served as the only port of entry in that part of the world.

Our bags were unloaded and taken into small, fly-ridden buildings that were buildings in name only. We filled out our exit papers, accounted for our money, and were well treated by the Soviet officials on duty. The customs man asked us to open two small handbags, but the examination was 10% perfunctory and 90% curiosity.

Mr. Abramov had telegraphed ahead to have some breakfast ready for us due to our hasty departure. We were escorted to a four-table dining room and served what passed for ham and eggs, but cooked in some gosh-awful sort of butter or grease that made the dish almost inedible. There was some bread and some poor preserves, some awful rank butter, and tea.

Between the dust and the flies and other insects, the Termez port of entry was pretty sad, pathetic and unhealthy. The outside toilet facilities, for those who bothered to go that far, were about as primitive and awful as I've seen. Termez is one place I hope I'm never stuck in overnight.

Goodbye, USSR

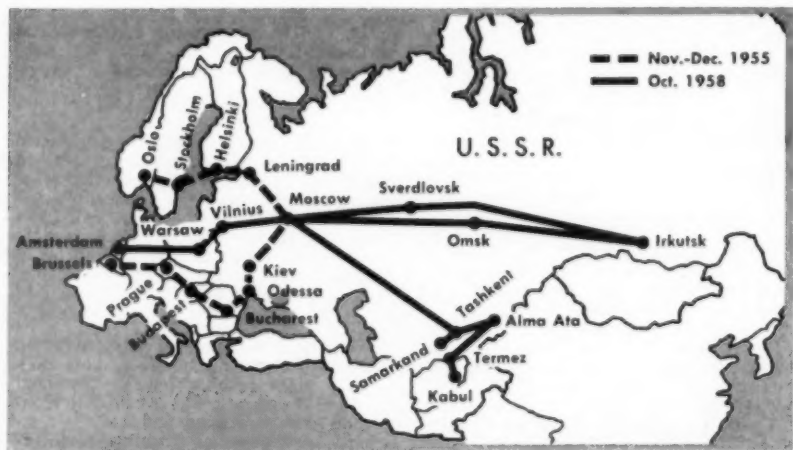
After about an hour, we took off over the town of about 30,000 with its unpaved streets, whitewashed adobe houses and virtual absence of motorized transport, and crossed the Oxus River to Afghanistan. Thus we had left the USSR, but this Asiatic region was a great contrast to the European Russia which we think of most when we think of the Soviet Union. Termez and Uzbekistan were a reminder that the USSR is a great complex of races, languages, customs, and climates.

There is a single bridge at this point, one of the few crossing points for a long distance. No military installations were visible. Along the Oxus on the south side was a green irrigated strip with nothing but arid desert and mountains beyond. The wide, but shallow and rambling Oxus has witnessed as much history as any river in the world. On the Afghan side was a dried-up little village. The road which led from the bridge turned west toward a low pass; the road journey to Kabul takes days and is a real adventure of expedition proportions.

Our Il-14 climbed steadily, as well it had to. Ahead was the famous rugged snowcapped mountain range called the Hindu Kush with peaks up to 20,000 feet and the lowest pass about 12,500 feet. The Il-14 can't fly above 15,000 feet and that is about the minimum flying elevation needed to clear the range. On cloudy days they just don't fly. Our stewardess, a pleasant girl who knew only a few words of English, passed out oxygen masks to all of the passengers. I needed oxygen at sea level that morning so it was more than welcome at altitude.

It's only an hour and twenty minutes from Termez to Kabul, but flying with Russian oxygen masks in an unpressurized Russian airplane that has a ceiling of only 15,000 feet over some of this world's most desolate and rugged country, is the sort of accomplishment of which I'm quite proud—after the fact. In any event the scenery was superb. The engines droned heavily and our plane actually began mushing along as we went over the top, but in a relatively short time we were descending quite rapidly into a large bowl-like area in which the capital is located.

About thirty miles north of Kabul we passed over a military complex where the Russians were building a military base and airfield for the Afghans. The sprawling old city of Kabul, largely unvisited by tourists in a land of Eastern mystery, looked exciting. Then we landed on a single unpaved strip and were met by a group of Americans to begin a new experience in still another strange land. I had now had two trips and a total of 33 days into that odd but huge place called the Soviet Union.

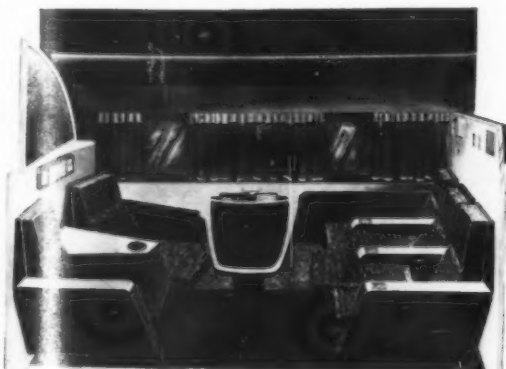


Map of Eurasia showing extent of WWP's USSR travels. Solid line marks current trip.



AEROTHERM LOUNGE ADDS PASSENGER "SELL" TO UNITED'S DC-8 MAINLINER

Check these features of the Model 603 Tourist Lounge:



- Seats recline individually to 35°.
- Seat bottom articulates with back recline.
- Individual seats, cushions, dress covers; completely interchangeable.
- Partition contains oxygen and reading lights.
- Outboard table fairing holds fresh air controls and covers air duct.
- All components quickly detachable for aircraft configuration change.



AEROTEC INDUSTRIES, INC.
AEROTHERM DIVISION, DEPT. A, BANTAM, CONNECTICUT

30-second ATC TRANSPONDER CHECKOUT

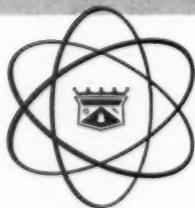


NEW!

The First Portable ATC Transponder Test Set

On the ramp or in the shop — AC or battery operated — this portable checkout system for Air Traffic Control Beacons provides a go/no go readout in 30 seconds. The 38-pound unit is entirely self-contained and offers optional radiation or umbilical testing. It evaluates the transponder response characteristics of the ATC radar beacon system and indicates instantaneous acceptance or rejection of the signal... an important aid in the pre-flight electronics checkout of the new commercial jet airliners.

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- Go/No Go Direct Readout
- Optional Radiation or Umbilical Operation
- Range of 10 to 50 Feet
- Self-contained Power Supply
- AC or Battery Operated
- Specially Designed Case for Performance in a Combustible Atmosphere or Foul Weather
- Dimensions—9-1/2 x 14 x 16 inches



For more information contact—

Packard Bell Electronics

TECHNICAL PRODUCTS DIVISION

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